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LIBERTY CAP AND YOSEMITE FALLS, IN YOSEMITE NATIONAL PARK, CALIFORNIA

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"HALL OF FAME" FOR TREES



THE DUMONT KENNEDY ELM

FOLLOWING the printing of the picture of the "Wye Mills Oak" in Maryland as the first picture in a "Hall of Fame" for trees, many pictures and much data have been submitted to the American Forestry Association. Have you a famous tree in your town? The Association wants trees with a history rather than trees of unusual size. The elm pictured here has been watched by Mayor Dumont Kennedy, of Crawfordsville, Indiana, for sixty years. This tree has a spread of 99 feet and is 78 feet high. The tree is more than 125 years old, according to Mr. Kennedy. It is four feet one inch in diameter four feet above the ground. It is not as large as the famous sycamore at Worthington, Indiana, which, for a long time, has been considered the largest shade tree in the country. As to the value of tree planting by the younger generations, Mr. Kennedy gives quite a sermon in one of his letters. This follows:

"I had 12 trees planted on May 10, 1902. I placed them in a circle on a slightly rising mound and set them so as to leave a center at least 100 feet across. This will make a fine place for a house some day, and everybody who sees it, exclaims, 'What a fine building place.' I think these 12 trees have added at least $1,000 to this acre lot. Before I set them it was a bare cow lot, worth about $200. I have talked trees all my life, tried to get all the school boys and others to buy a small tract of ground and begin while young to set trees and improve, but it is difficult to get a boy to understand that he will ever be a man and that he ought to prepare for old age while he has the strength and ambition. A boy thinks it will take so long for a tree to grow, but he never thinks that the time will go anyway, even if he does not set a tree."

It is just this point exactly that the American Forestry Association is placing before every school in the land.

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THE FOREST POLICY OF FRANCE

THE CONTROL OF SAND DUNES AND MOUNTAIN TORRENTS*

BY W. B. GREELEY

FORMERLY LIEUTENANT-COLONEL, 20TH ENGINEERS, A. E. F.

TWO facts stand out in the physical history of France which offer valuable lessons to the United States. The first is the solidarity between the mountain and the plain—the direct effect upon the lowlands of upsetting the normal balance of soil and vegetation in the uplands. The second is the value of the forest in stopping the movements of soil and water which have wrought havoc, in varying degrees, in practically every country on the earth. These lessons have been brought home to the French with force in the valleys watered by the Alps and the Pyrenees, and their long battles with torrential floods in the one instance, and with invading sand dunes in the other, have influenced profoundly their public forest policy.



IN THE FRENCH ALPS

All this section is denuded but efforts to prevent further washing away of the soil are being made by the erection of a large number of gully dams, some of which can be seen in the foreground.

The receding waters of the Bay of Biscay left a vast level stretch of sand and marsh in southwestern France known as the "Landes." Toward the sea, these barrens terminate in a belt of dunes from 6 to 10 miles in width. The dunes have doubtless moved inland at various periods, but appear to have been relatively stable during the Middle Ages. In the Seventeenth and Eighteenth Centuries, a new and menacing invasion of the interior took place, which French geologists attribute, in part at least, to the upsetting of the equilibrium of things by human action. The vegetative cover which had formed on the dunes themselves appears to have been broken up by the heavy grazing of the Gascon herds. At the same time, the increasing population in the Pyrenees, supported largely by pastoral industries, led to the progressive denudation of their steep mountain slopes, filling the rivers with detritus and swelling the dune-forming materials available to the tides and winds. At all events, the dunes on the coast of Gascony became dangerously active, many of them moving inland from 30 to 90 feet a year and burying farms and villages in their path.

Various attempts to check this invasion were made during the Eighteenth Century; but Bremontier, an Engineer of "Ponts et Chausses," is credited with having developed the methods which were successful in halting the destructive course of the dunes. Bremontier's scheme, which was worked out about 1784, comprised three steps:

(1) The construction of a rampart along the coast, a sort of sea-wall against incoming waves of sand. This was done usually by piling quantities of brush upon the last dune which was forming on the beach and building up this brush revetment, layer by layer, as fast as it filled with sand, until the sand could no longer break over the top.

(2) Planting hardy herbs on the dunes within the rampart until their surface became stable.

* Material for this article has been taken largely from "Cours de Droit Forestier" by Charles Gugot, and from data prepared by G. Garbe, Engineer des Ponts et Chausses.

(3) Planting seeds or seedlings of maritime pine, a fast-growing pitch pine native to the region, in this protecting cover of herbs.

Striking success in the use of this method led, in 1810, to the adoption of a national policy for the fixation of the Gascon dunes. There were delays and difficulties in developing an effective administrative procedure, stoppages due to the political overturns at Paris; and the inevitable conflicts with private property rights. The forestation of the 250,000 acres of dunes bordering the Landes was practically completed, however, by 1864; and the work since that date has consisted largely in the care of the plantations established, the construction of new ramparts along the coast where dangerous dunes were forming, the extension of the successive zones of vegetation up to the limits of security thus established, and the administration of the maritime pine forests which have been created.

The dune belt presented a complex tangle of ownerships—state, communal and private. The method of conducting the work of forestation which was finally evolved bears points of similarity to the plan adopted by some of our states, like Massachusetts, for the planting of private lands. It suggests a modus operandi for state or federal projects in America where the reforestation of private land is required in the public interest. Its principle is not the purchase or condemnation of private property, but the *expropriation of its tenure,* or occupancy, for a sufficient period to establish forests with provision for ultimately restoring the land to its owner when the cost of the enterprise has been met.

Each project was drafted by a local engineer (the work being conducted largely by the Service des Ponts et Chausses), with a map of all holdings involved, a detailed plan of work, and an estimate of cost to each owner. The project having been formally approved, each owner was given the choice of doing the work himself under state supervision, or of placing his land under the custody and control of the state which then proceeded with the reforestation measures at its own cost Once the forest was established, the owner could acquire possession of his land by reimbursing the state for its actual outlay with interest at the legal rate (4 or 5 per cent). Otherwise, the state retained possession until the proceeds from the forest had recouped its expenditures in planting and administration, when restoration to the owner was required by law. As a matter of fact, this process was suprisingly rapid, owing to the low cost of planting maritime pine, its rapid growth in the humid climate of the Landes, and its early yields of turpentine and timber. The state could also divide plantations on private land, restoring a portion to the owner and obtaining full title to the balance in liquidation of its account.

Of the original 250,000 acres of Gascon dunes, the French Government still administers about 150,000 acres. Most of this area has become a permanent state forest, forming a protective belt along the coast, which is managed with special precautions to prevent a possible outbreak of the old peril. The requirements of the "regime forestier," however, are applicable to forests of all classes within the perimeter of a dune fixation project in order that no excessive cutting may undo the great public benefit which has been accomplished.

The stabilization of the southwestern dunes in itself was a magnificent achievement in conservation, but it proved to be the beginning of still greater national benefits. Inland from the dunes stretches 2,000,000 acres of almost barren sand and marsh with a few patches of natural pine forest. In the Eighteenth Century, this region was thinly populated, had almost no industries except grazing, and was notoriously unhealthy because of its swamps. The successful reforestation in the dunes gave great impetus to the planting of maritime pine throughout the entire Landes, partly by transplanting wild or cultivated seedlings, partly by sowing pine seed in plowed furrows. During the Nineteenth Century, a least 1,500,000 acres of private land were converted into pine forests as the result of the demonstration furnished by the public work in and adjoining the dunes. The feasibility and profitableness of pine planting were so clearly established that a law was passed in 1857 prescribing the forestation of barren lands in this region owned by the Communes. This law was based upon the same principle as that applied in the fixation of the dunes. Project estimates were prepared by state officers and the Communes given the option of planting their holdings or turning them over to the Government for this purpose. It is noteworthy that in all cases the Communes chose to do the work themselves. Some 185,000 acres of Communal forests were created under this law.

The Landes today are a vast pinery, interspersed with little meadows and neat farms and traversed by a network of surfaced highways. With the spread of the forests and the simple drainage system which forms a part of forest culture, swamps and malaria have disappeared together. There is probably more grazing than ever before, utilizing the dense growth of herbage under the older stands of pine. The fertility of the farm lands has been steadily built up by mulching with litter and bracken from the woods, this being, on many areas, a crop harvested from forest lands almost as regularly as their timber or naval stores. Turpentine orcharding begins when the trees are 25 to 30 years old and is continued on a carefully regulated scale for at least 30 years, when the trees are bled heavily for 4 or 5 years before cutting. The population is several times that of the Eighteenth Century, and three-fourths of it is supported by forest industries.

These old barrens have been transformed into one of the most productive regions of France—a region which furnishes practically all of her naval stores and a large part of her general construction lumber, and exports quantities of pit props to the coal mines of Great Britain. It was one of the principal sources of timber supply for the Allied Armies. American forest engineers laid their logging tracks among the very dunes which were menacing wastes a hundred years ago, but which in 1917 fur-

nished railroad ties and lumber for prosecuting the great war. I doubt if the world affords a more striking example of conservation.

In the control of torrential erosion in the Alps and Pyrenees, with its disastrous effects upon farm lands in the valleys below, France has been confronted with a far more difficult problem. The difficulty lies in the fact that the problem is, at bottom, one in social economies. It is the old story of conflicting interests between mountain shepherds and lowland farmers, of isolated mountain folk, living under rigorous conditions and dependent upon pastoral pursuits, clinging obstinately to their ancestral rights and customs and resisting control for the benefit of the people of the plains with whom they had no community of interest.



REFORESTED LAND IN A FRENCH ALPINE REFORESTATION PROJECT

Torrential erosion in the French mountains is traceable directly to the denudation of their forests by over-cutting and of their grass lands by over-grazing. Under the *"ancien regime"* this does not appear to have been serious, partly because the mountains were thinly populated* and partly because of the rigid restrictions enforced by royal decree. The French Revolution either swept these restrictions aside or rendered them ineffective through lack of any agencies charged with their enforcement. The mountain population increased and for two generations was practically immune from outside interference in handling their growing herds. During the first half of the Nineteenth Century, the flood menace became steadily more alarming and was the subject of much investigation. French political thought, however, was still so strongly impregnated with the individualistic conceptions of the Revolution that legislatures were loathe to restrict the liberties of the mountain people. It required the terrible floods of 1859 to arouse the nation to action.

A law "on the reforestation of the mountains," passed in 1860, sought to stimulate forest planting in mountain districts by furnishing seed or plants and by paying cash bonuses for areas actually restocked with trees. The Council of State, furthermore, was empowered to establish by decree the boundaries of areas within which reforestation was essential to the public interest. Within each of these projects, Communes and private owners were required to reforest their lands or to turn them over to the state for this purpose. The private owner who declined to plant his land and carry out the other measures which might be prescribed, like the construction of brush dams, was expropriated outright, receiving the in-

* It is interesting to note that some of the mountain settlements originated with communities of refugees from religious persecution during the 17th century.

demnities accorded by the general laws concerning public works. He could reclaim his property within five years after planting had been completed by restoring the indemnities and reimbursing the state for the cost of its work with interest; or he could regain half of his property by restoring the whole indemnity and giving the state full title to the remaining half.

Communal lands were dealt with on the same principle as that followed in the sand dunes. Only the use of the land was appropriated, without indemnity, in cases where the Commune refused to reforest the ground itself. The property was to be restored to the Commune after the forest had been established and its cost to the public treasury had been recouped through the sale of wood. The Communes also could reacquire their lands, after planting was completed, by paying its cost or could reacquire half of the land by deeding the remainder to the state. The requirements and protection of the *"regime forestier"* were extended to all forests within the boundaries of a restoration project; and any grazing on them had to be sanctioned expressly by the forest officers of the state.

This drastic invasion of the private and community rights of the mountaineers had the effect that might readily be imagined were a similar undertaking launched in the southeastern mountains of the United States. The activities of the state were looked upon as designed primarily to curtail or prevent the use of the mountain pastures which the sturdy Alpine folk regarded as essential to their livelihood. The Communes also claimed, with a large degree of justice, that the practical effect of the law was to expropriate their lands without indemnity, for the high planting costs and rigorous climate made the prospect of a restoration of their property, after the state had recouped its outlay, extremely remote. The conditions in these respects were wholly different from those in the Landes. An attempt to appease the local sentiment was made by a supplemental law in 1864, designed to increase the grazing resources of the mountain areas by restoring the grass or turf on portions of the denuded and waste lands; but little appears to have been accomplished under this measure. Under these difficulties, the work progressed slowly and the question of "restoring the mountains" was a mooted one in the French Parliament during the 20 years following the passage of the law. Alarm was occasioned by the tendency of the policy to depopulate the mountains, for it was found that certain communities had moved out altogether as the result of its enforcement—which simply emphasizes the complex social aspects of the problem.

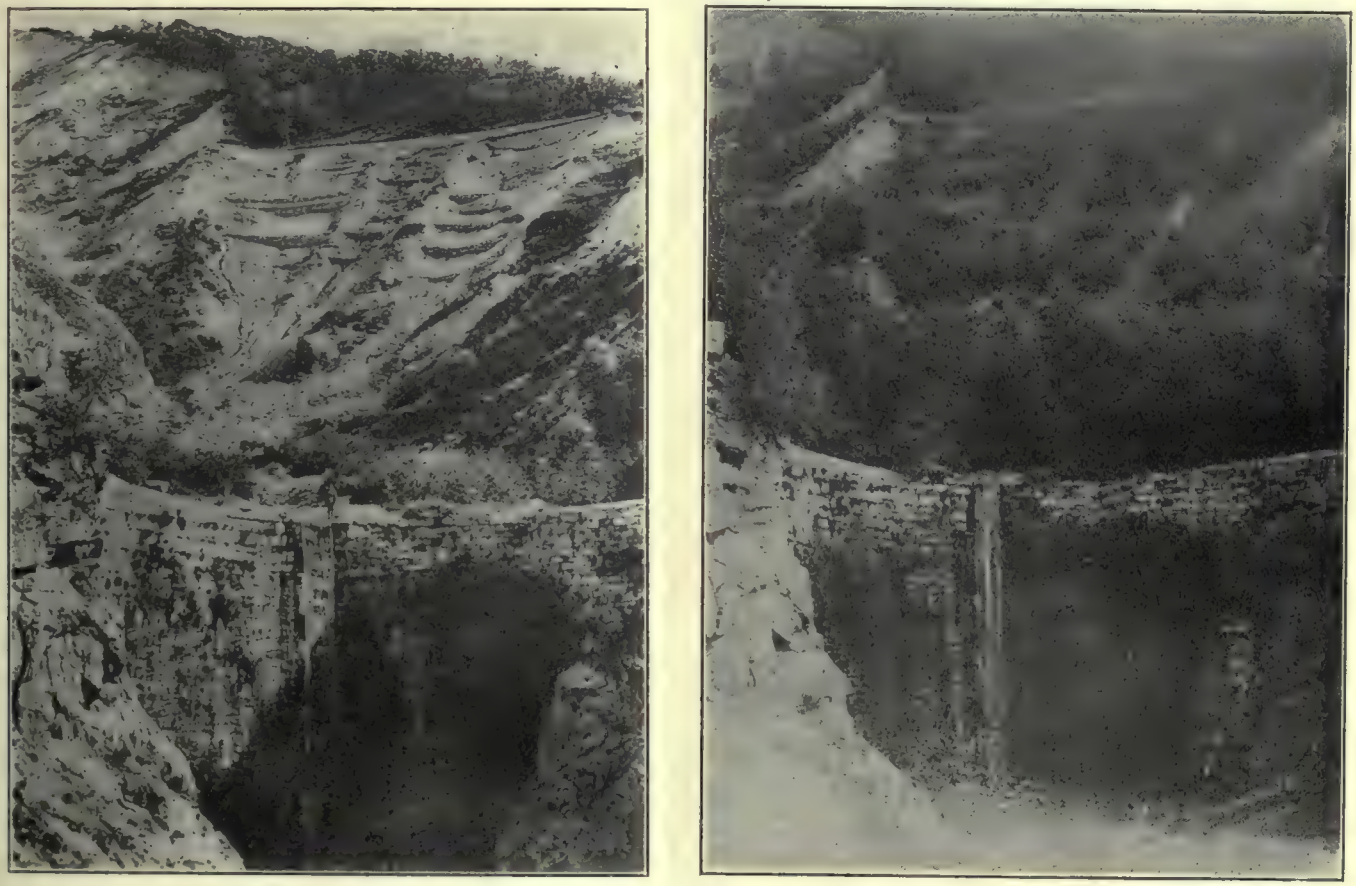
By 1882, the reforestation projects in the mountains had reached a total of some 350,000 acres. This included about 52,500 acres of Communal lands which had been actually reforested. In that year the whole policy was revamped. Under the terms of a new law, the areas where planting and other intensive methods were to be applied were greatly reduced, being limited to the immediate channels or slopes where torrential erosion was taking place. Within these restricted projects, all lands, private and Communal alike, were expropriated by the state with payment of full indemnities. Outside of the new perimeters, full possession of the ground was restored to its former owners, but any forests that had been established on Communal lands were kept under public administration in accordance with the general provisions of the forest code. The restoration areas thus became the absolute property of the state.

A new and important principle embodied in the law of 1882 was the establishment of large protection belts in the mountains, surrounding the limited water courses in which serious erosion was actually taking place and had to be fought by intensive methods. In these protective zones, designed to prevent the starting of fresh torrents, the public authorities were authorized to forbid any use of land or forest which would destroy the vegetative cover. And to extend further the general scheme of prevention, in which the earlier law had failed, the grazing of certain Communal pasture lands was placed under public control.

The difficulty in a straight-forward application of this policy and the desire to harmonize it with conflicting local interests to the last possible degree, as well as the administrative detail involved, are reflected in the slow machinery for putting the law into effect. Local forest officers prepare a minute plan of every proposed restoration project, with maps, lists of property owners, and cost estimates. This plan is subjected to (1) a public hearing in every village affected, (2) a review by the municipal council of each Commune whose property is included, with inevitable protests, (3) examination by the Council of the "Arrondissement," or County, (4) examination by the General Council of the Department, (5) examination by a special commission, consisting of the Prefect, or Chief Executive of the Department, representatives of the Communes affected, representatives of the various local councils, an engineer of "Ponts et Chausses" (bridges, highways and waterways), and a forest officer, and (6) review and approval by the Minister of Agriculture; and, in addition, the establishment of the restoration project must finally be decreed by act of Parliament. The forest officers then proceed to acquire the land designated, by friendly purchase if possible within maximum price limits fixed by the Minister of Agriculture, otherwise by public condemnation. Condemnation is resorted not only to extinguish property rights, but also the innumerable servitudes for use of timber, grazing, sheep or cattle driveways, quarrying, etc., which have so complicated forest administration in France and have often been a serious cause of erosion.

While the public acquisition and restoration of small areas where the immediate danger from torrents is acute has gone forward steadily on a small scale in spite of the difficulties encountered, little enough has been accomplished under the other provisions of the law. The procedure for designating and establishing protection belts, *"mise en defens,"* is practically as that required in creating the restoration projects themselves, except that the final word rests with the Council of State rather than

with Parliament. In the protection belt, any form of land use liable to create conditions favorable to slides or torrents—over-grazing, cultivation, the opening of quarries, etc.—can be forbidden or controlled by the Forest Service for a period of not more than 10 years, subject to an annual indemnity to every owner or lessee whose use of the ground is interfered with. At the expiration of 10 years, the landowner has the right, under the law, to compel the state either to withdraw its restrictions or to buy his property outright. French forest officers generally regard the expenditure of funds for such a temporary control of the use of land in the mountains as of little value in attacking the problem of erosion, and this feature of the law is a dead letter.



AN EXAMPLE OF FRENCH CONSERVATION

The first photograph shows the conditions of a gorge in France from which the torrent has washed the top soil and most of the vegetation. The second picture shows the condition twenty years later after the steep slopes of the gorge had been planted.

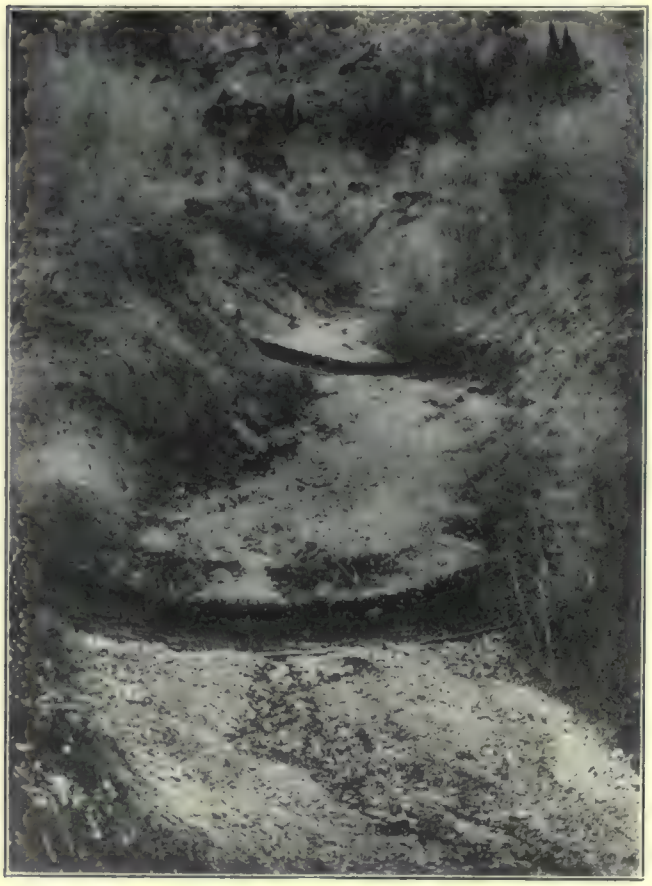
The attempt to control the grazing of Communal pastures is a similar story. This was the hardest nut to crack in the whole problem, but it contained the kernel of torrent prevention. Owing to their common ownership and the total lack of regulation, Communal pastures apparently were the hardest grazed of any. The members of the mountain communties frequently took good care of their own grazing land but vied with each other in getting the last bit of forage from the village commons. The result was not unlike what took place on parts of our public range in the old days. A good part of the turt was destroyed altogether and bad washes, gullying, and land slips became common. The Communal pastures through the French Alps, covering much ground above timberline and often occupying old lake beds and steep slopes at the heads of water sources, were a very important factor in the situation.

The control of grazing on these areas had extended on paper to some 325 Communes in 1901. In practice, tenderness in dealing with the mountain settlements has made it of no effect. The law of 1882 gave the Communes an opportunity to frame their own grazing regulations. These were to specify the land which should be pastured each year, the driveways to be used, the grazing period, and especially the number of each class of stock to be admitted. If the restrictions proposed by the Commune were satisfactory to the Forest Conservateur, they were to be put into effect by decree of the Prefect. As a matter of fact, the Communes have never proposed any regulations for their grazing lands, and this work has all fallen upon the Forest Service. The grazing plan prepared by the Forest Conservateur is passed upon by an advisory commission representing the Commune, the county, and the National Administration;* and may then be put into effect in the discretion of the Prefect.

Contrary to the principle adopted in most other features of this policy, the Communes have not been indem-

*In this, as in all other features of the policy, the attitude of the local commissions has been consistently hostile to the efforts of the Government.

nined for reductions and restrictions in the use of their grazing lands. This fact has added to the tenacious resistance of the mountain villages against outside interference in handling their own property; while the low penalties of the law make an enforcement of the grazing rules ordered by the Prefect practically impossible.* An investigator reported in 1899 that out of the 300 odd Communes, the regulation of whose grazing lands had



SAVING A MOUNTAIN STREAM

This conservative project is being conducted by the placing of brush dams in the bed of the mountain torrent.

been prescribed, but 3 or 4 showed any appearance of regulation, and in no case was the regulation really effective.

While these human obstacles have largely nullified the broad protective and preventive features of the forest policy of France toward her mountains, she has accomplished splendid results through the public acquisition and restoration of limited areas where devastation was most acute. Aside from the Communal lands which were reforested under the earlier law, the state has acquired some 200,000 acres of mountain slopes and gorges. The checking of torrential erosion on these areas is an example of conservation by intensive methods fully as striking as the stabilization of the sand dunes. The line of attack is to reduce the trickling action of water on slopes, prevent the starting of gullies, and hold loose soil or rock in place. Tree planting is the primary method, but it may be necessary to stabilize the soil or stop the cutting action of streams before planting will be effective. Small gullies are blocked up with dams of sod or loose stones, brush rip raps or tree tops laid with the tip up stream and the butt fastened to a picket. Stretches of gully are often filled with brush, matted and criss-crossed and held in place by limbs thrust into the banks. More elaborate dams of rubble or masonry have been built in the main channels of many torrential streams, often at intervals of a few rods, in order to check the rush of flood water and afford soil-collecting basins which will ultimately be planted with trees. Rubble or masonry dams have also been constructed at various points to stop the caving in of banks or to check incipient or threatened land slips. The slipping of one layer of soil over another from saturation with water, a form of erosion common in the clay soils



FIGHTING SOIL EROSION IN FRANCE

The fresh gullies on the slope on the right have been filled with brush. The land above them has been successfully planted and planting of the slope will follow.

of the Southern Appalachians, has been combatted by the construction of paved, open drains, or gutters. Similar structures have been employed at a few critical points to confine the channels of streams. Slopes where snow avalanches are frequent and dangerous to villages have been dotted with walls of dry masonry, usually about 45 feet long and 6 feet in the clear on the upper side, so arranged as to overlap each other in the echelon formation of advancing troops. For these walls, low "berms" may be substituted, made by simply excavating platforms

* The Penalty is a fine of 1 to 5 francs for each offense, regardless of the number of animals, and can be imposed only upon the herdsman—not upon the owners of the stock.

six feet wide in the hill side. The ground behind such structures is planted as soon as practicable. Hardy shrubs are set out in masses of glacial drift or the talus of a slope where the ground is too unstable or too sterile to support trees; but the aim in all cases is to get the land in forest as soon as it can be done. The more elaborate masonry structures have been employed but little in later years, at points where particular villages, water power works, or railroads have required special protection.* The experience of the French has demonstrated that progress in the control of mountain erosion as a whole is measured by the spread of the "armor of the forest" over denuded slopes.

The restoration projects of the state are still supplemented by the effort initiated in 1860 to induce private land owners, Communes, associations of land owners or cheese-makers, etc., to protect their own holdings with public aid and co-operation. The state may furnish seed or plants for tree planting or improving pasture lands, or may co-operate in the construction of dams and avalanche breaks, or may pay the owner a fixed sum upon his completing plantations or other measures approved by the forest authorities. The amount or form of assistance is not covered by fixed rules. Each project is worked up by the local forest officers and submitted to the Secretary of Agriculture for approval. The aggregate amount of co-operative work of this character has not been great.



THE BED OF AN ALPINE STREAM

The torrents of water which swept down this water course have been in a measure held back by a series of barrier dams while trees have also been planted.

Many bills have been introduced in the French Parliament to give her mountain watersheds better protection. Nearly all of these have sought to create large protective belts, carrying out the principle of prevention which is embodied in the present law but has failed in its application. The proposed legislation is built up largely on three principles:

(1) The nationalization of much larger areas in the mountains, extending the perimeters of the existing restoration projects to cover the whole watersheds, not merely the parts of them where immediate erosion is active or dangerous.

(2) The placing of all forests in the mountainous sections of France under public control and giving them a special status as *protection forests.* Such areas would either be put under the "regime forestier" or made subject to special regulation forbidding the cutting of small trees without public sanction. One of the proposals would exempt protection forests in private ownership from taxation.

(3) The establishment of a *"regime pastoral,"* corresponding to the present *"regime forestier"* but covering private as well as Communal grazing lands in the mountain regions. Grazing would thus be regulated by the Service of Waters and Forests as public owned timber lands are now controlled, and the recalcitrant Communes would be compelled to submit to national regulation of their pastures as they were in 1827, in the case of their forests. The principle of the *"regime pastoral"* is exactly that which has been applied in the National Forests of the Unted States—to limit the number of stock grazed on every holding to what its forage will adequately support without deterioration. On Communal lands, it is proposed to allot grazing sights to every member of the Commune, thus dividing up the total number of sheep, goats or cattle which the Communal pasture will support. Under this plan, the individual citizen might either use his grazing right himself, or rent it to others.

Americans may well be gratified that the development of our National Forest policy at an earlier stage in the settlement and economic growth of the nation than the measures attempted by France has placed us in a much better position to protect our mountain watersheds. Everything proposed in the most progressive bills before the French Parliament can now be done on practically all of our mountain watersheds in the West under National Forest administration and can be extended to the watersheds of the East under the policy initiated by the Weeks Law. The lesson for us to draw from the bitter experiences and handicaps of France is to let no influence or local interest break up the national protection of our watersheds in the existing public forests or stop the extension of such protection to all important watersheds in our mountain ranges.

*These costly structures were undertaken, as a rule to protect local property or economic interests of special importance, where it was feared that protection from reforestation would come too late.

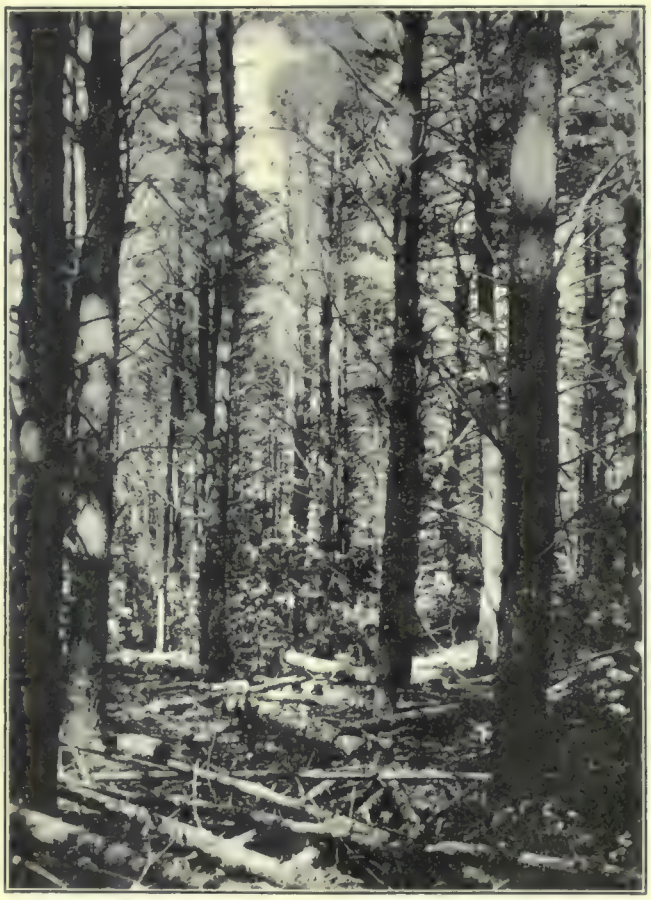
FORESTRY IN SOUTHERN NEW ENGLAND

BY RALPH C. HAWLEY

PROFESSOR OF FORESTRY, YALE UNIVERSITY

SOUTHERN New England for our purposes may be taken as including the states of Connecticut and Rhode Island. This territory is one of the most thickly populated sections of the United States, surpassed only by Massachusetts and New Jersey. In 1910 it had a population of 281 inhabitants per square mile of territory.

Southern New England boasts of excellent transportation facilities. The New Haven System reaches into all sections of the territory. Roads, oftentimes of state construction, enable the use of motor trucks in bringing forest products from nearly every lot to the railroad. From the logging standpoint, the region may be said to be exceptionally well developed.



JUST AFTER THINNING OPERATIONS

A thinning has just been completed in this white pine stand 58 years of age. 7000 board feet of lumber were cut and 27000 board feet left per acre in this operation.

The region is primarily a manufacturing district. In 1910, 8.8 per cent of the population were engaged in agriculture, while 54.0 per cent earned their living through manufacturing and mechanical industries. These industries are of such character that they do not use wood as their chief product. Such an industry as the pulp wood business of Northern New England, utilizing softwood logs as its chief raw material, does not exist in this southern district. The industries require wood products for shipping their output or for minor uses in connection with manufacturing processes. The fact that forest products do not constitute the chief raw material for the local industries has great influence in determining the attitude of the population toward the forest resource.

The forest area of Southern New England is now about 46 per cent of the total land surface. This is equivalent to 1,750,000 acres of forest land. The area forested is apparently on the increase. In 1910 the forested area was estimated at 41 per cent, in 1850 as 32 per cent and in the Connecticut portion of the territory in 1820 as about 26 per cent. This is the lowest point to which the forest area has sunk since settlement of Southern New England.* The present forested area may be considered, with very few local exceptions, better suited for growing trees than for the production of agricultural crops.

Agriculture in Southern New England is essentially a minor industry as compared to manufacturing. The soils which are capable of profitable agricultural use in competition with better lands to the south and west, are already utilized.

It is interesting to note the ownership of the 1,750,000 acres of forest land. Roughly estimated, this is held as follows:

State Parks 0.25%
State Forests 0.25 "
Municipal Forests . 1 "
Corporations 3 "
Lumbermen 1.50 "
Individuals 94 "

The National Government does not own forest land in Southern New England.

The forest is primarily hardwood in character. One type, called the upland hardwood, comprises over 80 per cent of the forest area. This was originally composed of chestnut, oaks and a variety of other hardwoods. As a result of the chestnut blight, chestnut will soon be exterminated in the commercial sense. The oaks remain as the principal trees. Less than 7 per cent of the forest area is occupied by the swamp hardwood type. Soft maple, elm, yellow birch, black and white ash, with other moisture loving hardwoods make up the composition.

Stands of pine—usually white pine, with some pitch pine—cover about two per cent of the forest area. This type is an intrusion into Southern New England of the pine region to the north.

Old fields occupy nine per cent of the forest area. Under this term are included the fields, both those cultivated and those only pastured which have fallen into disuse and are reverting to brush and forest growth.

* See "Changes in the Forest Area of New England in Three Centuries" by Roland M. Harper, Journal of Forestry, Volume 16, Page 442.

The character of the forest growth on these lands is decidedly different from the hardwood forests. Light seeded trees such as gray birch, soft maple, aspen and the common red cedar are the typical trees on the old fields. It may take a century or more for an old field to become completely stocked with trees.

Hemlock, as a type, forms about two per cent of the area, usually being found in ravines, and on steep, broken, rocky slopes.

As a whole the forests of Southern New England are of second growth, Two or more centuries of settlement has resulted in the destruction of all the virgin timber. The original forest is now replaced by second, third or fourth generation stands, composed largely of trees originating from sprouts rather than from the seed.

On the upland and swamp hardwood types, clean cutting has been the usual method of harvesting the crop. Such cuttings have resulted in continued production of hardwood trees. In some cases inferior species have been unsaleable and such material has been left to interfere with the succeeding second crop of more valuable trees.

The pine and hemlock lands, when cut over, tend to become stocked with hardwoods.

Forest fires have been far more destructive in rendering areas barren than have been the cutting methods. A majority of the fires throughout Southern New England arise from railroad locomotives. Hence the burned lands lie mainly in proximity to railroad lines. There is no large waste land type created by clear cutting and fires such as exists in Pennsylvania and the Lake States.



A FINE YOUNG RED PINE

This red pine is in a forest plantation fifteen years old and eighteen feet high. This sturdy tree is not so susceptible to disease and insects as in the white pine.

The holdings of forest land are too small for the individual owner to be able to furnish fire protection at his own expense. He must look to the state authorities to protect his property. As yet legislators in this region have failed to see the importance of the fire problem and still furnish small and totally inadequate appropriations for handling the fire situation.

The Best Forestry Practice for Each Type.

In the following paragraphs an attempt is made to outline various methods of treatment which have been tried on each of the different types and can be recommended as practicable.

Upland Hardwood.—During the last decade, removal of blight killed chestnut has been the chief problem. Where chestnut was thick and oftentimes pure over small acreas its removal leaves large openings in the forest cover. At the present time good stands of merchantable chestnut, even in a dead or dying condition, are scarce. Chestnut was the most valuable tree for management and following its commercial disappearance comes the question of what should be done with the hardwood type. Two methods have been advocated and are both in use. Under the first, many owners attempt to plant the lands cut over for chestnut with the idea of converting the hardwood type to stands of pine. Usually a dense growth of shrubs arises on cut over hardwood lands and the blighted chestnut sprouts come up quickly and live long enough to offer considerable hindrance to planted pines. These shrubs and sprouts must be cut back two or three times during the first decade after planting in order that the planted pines may live and make rapid growth.

Personal experience has convinced the writer that where planting of pine is attempted on cut over hardwood lands, the trees should be set widely apart (12x12 feet) and standing in the openings between clumps of sprouts. In this way three to four hundred trees per acre can be used, greatly reducing the original cost of the plantation as well as the cost of cutting back shrubs and sprouts which threaten to overtop the pines. The second method of treating the hardwood type after the removal of the chestnut, is to work for the production of hardwoods. Inspection of cut over areas which are unburned, will usually indicate that there is a sufficient stand of valuable seedlings and sprouts on the ground after the removal of the chestnut, to form an adequate stocking.

It is true that the yield of hardwood stands is much lower in merchantable timber than that of pine plantations, but on the other hand, the cost of securing the pine plantations is far greater. It is difficult to give accurate financial statements representative of the results secured by the two methods and which of the two is best

financially is, therefore, open to argument. Unquestionably there is room for both of these methods. There is far too big an area of the upland hardwood type to permit of its conversion to pine on a wholesale scale. The individual owner will find a relatively small area planted to pine all that he wants to work with. This is true because such plantations require a great deal of work in lopping back hardwood sprouts and seedlings of inferior species, which threaten to overtop the pines. When the gypsy moth is present, as is the situation in



SELECTION CUTTING

This shows a selection cutting in the hemlock type. The timber was about 100 years old and the openings made by this cutting are already stocked with hemlock seedlings.

the eastern portion of Southern New England, there is more reason for attempting to convert the hardwood type on a large scale to pine.

Some owners situated near good cordwood markets are making thinnings in their hardwood stands at an immediate profit. From their beneficial effect on the growth and increased yield of timber such thinnings are recommended even if the returns only offset the cost of the work.

Swamp Hardwood.—This type is usually cut clear and allowed to reproduce by coppice shoots. Growth in these swamps is rather slow. The ground is difficult to log except in the coldest weather when frozen.

Pine Type—Pine in Southern New England grows naturally on both light sandy soils and on heavy soils when it associates with hardwoods. On the former type of soil, natural reproduction can be successfully secured by removing the old stand in two cuttings. The first cutting takes out 40 to 60 per cent of the timber, leaving the balance well distributed over the area to furnish seed and shade to young seedlings. In a few years reproduction starts and within five or ten years, the remainder of the timber may be removed. A good illustration of what can be done in the way of getting natural reproduction of white pine on sandy lands may be observed on the property of the A. D. Bridge & Sons Company, near Hazardville.

On heavy soils, hardwoods compete with the white pine and usually reproduce before the pine. On such lands, probably the best policy is to cut the pine clear and then replant the area after this cutting.

Old Field Type.—Planting is the treatment required and commonly practiced for this type. White or red pines are used in planting. Southern New England lies quite largely south (or below in elevation), the range of



THINNING FOR CORDWOOD

A profitable thinning for cordwood in the hardwood type. The remaining trees will be left to grow to sawlog size.

wild ribes. In portions of northwestern Connecticut wild ribes are abundant. Elsewhere they are relatively scarce. Since the ribes are the hosts supporting one stage of the white pine blister rust, their presence or absence in the region is largely instrumental in determining the advisability of planting white pine. Outside of northwestern Connecticut, and possibly other small restricted areas, it may be considered safe to continue planting this tree. Red pine, due to its greater hardiness and freedom from insect pests, as well as from blister rust, is often

preferred. The writer inclines strongly to the use of red pine.

Three-year-old transplants are used in planting old fields where the grass sod is thick or low brush cover abundant. Where the sod is very light and conditions of competition with brush are not severe, smaller stock may be used. There is, however, less field for small seedling stock in southern New England than is the case farther north.

A good many individuals and corporations have planted considerable areas of this type already. The New Haven Water Company, with about 1,500 acres planted, probably heads the list. Many plantations in the old field type need subsequent treatment in order to protect the pines from encroachment of hardwoods. There are apt to be large hardwoods scattered on old fields with broad crowns which overtop the pines. These hardwoods are cut.

Hemlock Type.—A hemlock stand lends itself well to aesthetic treatment and where retained should be managed principally along such lines. The type located in cool, rocky gorges and on steep slopes occupies poor and relatively inaccessible sites from which the timber production cannot be high. As a commercial proposition hemlock lands are better planted with pine. When the aesthetic purpose governs the management, selection cuttings, with the idea of developing an unevenaged forest, are employed.



MAKING A LIBERATION CUTTING TO FREE WHITE PINE

Conversion of the upland hardwood type to pine. In this case the area was planted to pine before cutting the hardwoods. The stand was thinned twice before underplanting with pine. Now the remaining hardwoods are being felled.

Extent to Which Forestry Practice is Now in Effect.

As you go through southern New England, not much intensive forestry practice can be observed. The great drawback is the lack of the necessary wood capital in the forest. Most owners find themselves with cut over lands on which the timber is too young to admit of annual cuts and a regular income. The average forest owner is in a stage of development where he is marking time and waiting for his forest capital to accumulate by growth. When recently cut over land is acquired, a period must be spent of several decades in building up the wood capital before profits can be secured. Hence intensive forestry taken up now requires investment which will not bring annual returns for a good many years. Such an investment is impossible for a large majority of forest owners.

There are, however, more owners than is commonly believed who have benefited by the educational campaign and who are practicing forestry in a crude way and will practice on an intensive scale as soon as their wood capital is built up.

In many instances simple protection of the growing timber means a rough practice of forestry.

Another difficulty met with in practicing intensive forestry is in marketing cordwood and hardwood logs profitably. Although a densely populated region, the demand for cordwood is far below the available supply. It is often hard to find a market for many of the common hardwoods of southern New England. This is due partly to the scattered distribution of the hardwood timber, making it difficult to get a reasonable quantity of one kind of material at one place. Then, native hardwoods are of poorer quality than those grown in the South. This is not because high grade hardwood timber cannot be grown in southern New England. As soon as the virgin hardwood timber of the southern Appalachians becomes exhausted, southern New England timber will appreciate in value.

The extent to which forestry can be practiced differs with different classes of owners. In the case of the State Parks, and State Forests, they may be said to be already under management. On the State Parks the aesthetic idea of course predominates, but this need not interfere with the commercial production of timber on most sites. Nearly all the municipally owned forests are under good management.

Among corporation owned forests there is a difference in management depending upon the character of the owning corporation. The water companies, of which there are a number in this district, are all practicing relatively intensive forestry. This is true to a lesser extent of the brass industry which uses thousands of cords of wood in manufacturing processes.

In the case of the lime kilns and brick yards there is very little practice of forestry. Such plants are interested in cord wood which is a low grade product and which can

be secured by clear cutting wodland at a relatively early age. Yale University furnishes one example of a corporation practicing intensive forestry with a holding of 1,500 acres in this region.

The lumbermen who own lands in southern New England, with a very few exceptions, do not practice forestry. They mainly aim to sell their lands as soon as possible after they have been cut over. In a few cases quite intensive work is being carried on by lumbermen along the lines of planting, or in reproducing stands of pine.

Among individual owners, two classes can be distinguished. The first class would consist of city men of more or less wealth who have gone into the country either to live the year round or for summer homes.



WHITE PINE SET IN 1909

This plantation of white pine was established seven years ago. The trees are now growing in height at the rate of about 2½ feet per year. The large hardwood in the background should be removed.

These men, when they acquire forest property, usually desire to put the land to the use to which it is best suited and to bring it to a high state of productiveness. They are pursuing a similar policy with respect to their agricultural lands and are glad to do the same with the forest land. While this class of owners is increasing, it as yet owns only a small fraction of the forest area—probably around five per cent.

The second class of individual owners is composed mainly of farmers whose chief interest is in the management of agricultural land, and who cannot afford to make large investments to develop their forest land. As yet farmers have put into practice very little forestry, but it is probable that a large percentage of them have done some thinking on the subject, and as their timber comes to cutable size they will endeavor to handle it more conservatively than in the past. A difference can be noted in the attitude of the southern New England farmer to his woodland as contrasted to the northern New England farmer. The latter knows the value of young, immature trees, realizes the relative value of the different species and in his cuttings for cord wood or lumber is apt to take pains to save these smaller trees.

In southern Connecticut small trees as yet receive little or no consideration. This is due partly to the methods of cutting, which are mainly clear cutting and also to the fact that as yet special markets (more or less standardized) for each of the different species have not been developed.

For the rough practice of forestry, the chief essential is fire protection. This is true since the main type, upland hardwood, perpetuates itself by sprouts and consequently clear cutting does not necessarily decrease the producing power of the site.

For intensive work, thinning, in order to increase the production, longer rotations, in order to bring a larger part of the forest crop to timber size and planting of waste lands, are the important lines of work. As time passes and market conditions become better, unquestionably a large percentage of the present small holders will voluntarily take up more intensive methods.

Future Development.

Within the next decade or two, a large increase in the acreage of State Parks and State Forests should be effected. A minimum of half a million acres is not too large to look forward to as the ultimate goal for such ownership.



A PORTABLE MILL

Sawing away at hemlock and hardwood cut in a forestry operation. In the foreground a stand of timber 100 years old and yielding 30,000 board feet per acre was cut and the land planted with red pine transplants. The mill is set up in an old field which will be planted as soon as the lumber is hauled away. In the background is the hardwood type from which the chestnut has been removed.

Municipal forests may enlarge to some extent but it is not believed that a very considerable increase in this line of ownership need be expected.

Corporations as forest owners are apt to slowly enlarge their holdings, but here also it is unlikely that any great change will take place.

The holdings of lumbermen are more likely to decrease than to increase. As their present timber and the available supply that they can buy becomes exhausted, these men are apt to turn their attention to other lines of busi-

ness. They are interested, not in growing trees, but in harvesting timber.

Individual owners will keep control of the better lands and those that lie in smaller areas. Intensive work may be started at once by wealthy owners who can afford the investment, but on the great bulk of individual holdings, such work will only be started when it is able to pay its way. These individuals will remain holding the large part of the forest land. They must have State or Federal fire protection. They must be educated to lengthen the rotation on which their timber is cut and to produce a larger percentage of saw timber. They must be educated to carry on thinnings. Finally the development of forestry practice on these small individual holdings is going to be greatly stimulated if better and more copious market information can be supplied.

An arrangement for cutting and marketing forest products co-operatively would be of great value. As yet too little has been done along this line. The States have usually contented themselves with making a wood industry study which listed the names of men in different industries and gave general information about the character of the product and the amount used. This is not sufficient for the purpose of the small individual owner and it is believed that the State has got to go much farther along this line to develop the practice of forestry in southern New England.

On the whole, the outlook for the practice of forestry in this region appears encouraging. It will take time for accomplishment, but as the present young timber matures, and as the larger centers of timber supply are cut out and it becomes more and more expensive to import lumber, the price of local lumber is going up. Southern pine is expected to be practically exhausted in five or ten years and certainly by that time a decided increase in the prices of local lumber may be expected. Price increases will make possible more intensive work and will influence more owners to manage their woodlands as permanent crop producing property.

A PRECOCIOUS YOUNGSTER

Woodbridge Metcalf, Assistant Professor of Forestry, University of California.

THE Big Trees (Sequoia gigantea) of the California Sierra's have long been known as the oldest living things in the world. The massive proportions to which they attain and the tenacity with which they cling to life for two or three thousand years have made them famous throughout the earth. Here, however, is a youthful member of the ancient family which is not content to allow the grandfatherly ones to carry off all the honors but must do something unusual in its own small way.

In its fourth year from the seed this small Big Tree produced on its leading shoot a perfectly formed cone. This being infertile has not interfered with the terminal bud activity and the shoot is continuing its vertical growth from the apex of the premature cone. Surely this is an interesting demonstration of the fact that cones are simply modified branches, the leaves of which are also changed in shape to form the cone scales.

Other members of the taxodiaceae family, to which the Big Trees belong, sometimes show similar interesting growth variations which however do not appear so early in life. Trees of the coast Redwood (Sequoia sempevirens) are occasionally found having branchlets and foliage protruding from the apices of several cones. The important Sugi Tree of Japan (Cryptovenia japonica) often produces many such cones while still a young tree. In both redwood and sugi tree, however, such cones are generally found on lateral branches and not on the main stem.



THE FREAK BABY BIG TREE

This young Big Tree and another with a similar growth were pointed out to me by Mr. H. A. Greene of Monterey, where he had them growing in his unique "tin-can" arboretum. Mr. Greene was glad to give me the tree in order that it might be photographed for the information of readers of American Forestry.

CONSIDER THE WOODLOT TO KEEP IT PRODUCTIVE

WHAT OUR FORESTS SUPPORT

BY FRANKLIN H. SMITH, STATISTICAN IN FOREST PRODUCTS

THE American public has a vital interest in the perpetuation of our forests. This interest is not only in the daily necessities and comforts that the forests provide; the continued productivity of our forests has a deep economic significance for all the people. Wood in one form or another—rough, perhaps, as in the case of fuel, or refined, as in the case of a beautifully finished piece of furniture—is the principal raw material that enters into the making of thousands of manufactures and the turning out of these varied products involves the labor of millions of persons, backed up by the capital investment of billions of dollars. Should the forest crop be shortened, the manufacturer would be deprived of his raw material, and labor, in turn, would lack employment. So whatever tends to maintain an abundant annual forest crop is perforce an ally of the public, and whatever tends to diminish such a crop, whether it be poor utilization, carelessness, or fire, robs labor and the public of just so much of their rightful heritage.

The average man sharpens a lead pencil and notes the softness of the wood, the ease with which it cuts, and the smoothness of the sharpened surface; he feels the "give" or elasticity of his golf stick as he drives the small ball on its course toward the next hole; he gazes at the beautiful wavy grain of his highly polished desk or table top; but seldom does he stop to consider the source of the raw material, the means of utilizing the various woods, or how dependent he is upon the forest for the necessities, comforts, and even health of his every day existence. He takes the pencil, or the golf stick, or the desk as a matter of course, along with the other daily conveniences provided, without stopping to reflect upon what they really represent to him in facilitating his day's work, play, or rest, and how inharmonious his work-a-day world would be without these indispensable articles of wood.

Hardly for a moment from the time in the morning when Mr. Citizen rolls out of his walnut four poster on the second floor of his cozy shingled house, sets foot on the polished hardwood floor, stubs a toe against the rocker of his comfortable arm chair, and takes his razor from its veneered box on the wooden shelf in the bathroom, until he tumbles into the same four-poster at night does he lose contact with wood in some form or other. He may rest his elbows on the breakfast table of mahogany from an easy position in his wooden chair, while he glances over the headlines of the morning paper made of wood pulp. Selecting a cigar from the cedar box, which he lights with a match of pine, he closes the wooden door behind him as he goes out and takes either the plebeian trolley car of wooden type, or if he is fortunate enough to own one, a motor car, many parts of which are of wood, and so reaches his office. Thus it goes all day long—much that he touches or employs is of wood. In his office he is surrounded by desks, and chairs, and filing cabinets, and bookcases made of wood. The surface of the street he crosses, dodging heavily laden wagons in his hurry, may be paved with wooden blocks. And those same heavily laden drays bear merchandise of every sort securely contained in wooden boxes and crates. The very toothpick he may reflectively stick between his lips after luncheon is of wood. All of which brings us down to the point where we can seriously consider the great value of our forests and their economic importance to the wealth, independence, and prosperity of our country.

The wood-producing and wood-using industries of the United States form an important and interesting division of the country's industries. Some of them we immediately recognize as directly associated with our daily doings, while others we may look upon as being rather remotely related to the work or play of the day. Perhaps not all of the following named industries are completely descriptive, but the list will serve to indicate to the reader the general products manufactured: Lumber and timber products; planing-mill products, sash, doors, blinds, and general millwork; window and door screens and weather strips; wooden packing boxes; cigar boxes; barrels and kegs; turned and carved wood; lasts; wooden furniture, including rattan and willow; show cases; billard tables and materials; looking glasses and picture frames; sewing-machine cases; baskets and rattan and willow ware; coffins and burial cases; rules; matches; pulp goods; wood carpet; charcoal; treated and preserved woods; carriages and wagons; airplanes; agricultural implements; dairymen's, poulterers', and apiarists' supplies; wood for engraving; musical instruments and materials; paper and wood pulp; phonographs and graphaphones; tobacco pipes; refrigerators and kitchen cabinets; ships and boats; toys and games; turpentine and rosin; washing-machines and clothes-wringers; wood distillates; artificial limbs; professional and scientific instruments; handles; clocks; playground equipment; printing material; trunks; shuttles; spools, and bobbins; firearms; pulleys and conveyors; patterns and flasks; pumps and wood pipe; tanks and silos; bungs and faucets; brooms and carpet-sweepers; paving materials; plumbers' woodwork.

A mere glance at the list must awaken in even the unobservant person a realization of the great diversity of those forest products that enter into his or her daily routine. Wood is peculiar in that while it is not fabricated like iron or steel it readily lends itself to almost any combination or fashioning where the main requisite is strength, lightness, toughness, softness, ease of turning, quickness of working, beauty of design or finish, durability, or a grouping of several of these qualities. The uses of wood are multitudinous and so commonplace that its indispensability is rarely given a thought. To deprive man, even to a limited extent, of such a friend as wood, which nature has so lavishly provided

in quantity and quality, would prove to be a dire deprivation. Our forests must be loved, protected, and encouraged as friends.

Forests play a leading role in the country's economic life, since from them comes the raw material that supports a large share of its industries. Even a hasty analysis of the available figures brings this fact most forcibly to mind.

Census data for 1914 show in round numbers 276,000 establishments engaged in manufacturing, and of this vast number 52,000, or 19 per cent are establishments depending solely or in part on the products of the forest for raw materials used in their varied lines of manufacture. In other words, nearly one-fifth of all the the manufacturing establishments throughout the country use timber in one form or other, and they would be handicapped by decreased supplies and forced to cease working if no wood were obtainable.

Employment is given by the 276,000 manufacturing establishments to 7,000,000 wage earners. Of this vast army of toilers, who keep the wheels of industry moving, 1,130,000, or 16 per cent earn their wage in the 52,000 wood-using plants. To a man these wage earners should be interested in the proper use of our forests, for from the annual crops must come the wood which they handle to make their livelihood.

The manufacturing establishments of the country pay out annually in the aggregate 14¼ billion dollars foı raw materials, and the part of the wood-using industries in that huge expenditure amounts to more than one billion dollars, or 7 per cent. The value of the products of the 52,000 establishments amounts to nearly 2½ billion dollars a year, or 10 per cent of the toal value of all manufacturers. The value of the products of the wood-using industries is slightly more than doubled by the process of refinement at the hands of the more than a million wage earners. The capital invested in the 52,000 plants, totalling 3 billion dollars, is 13 per cent of the aggregate investment of 22¾ billion dollars in manufactures.

These are huge figures and their very magnitude makes them difficult of ready perception. But in no other way, perhaps, can the greatness and wealth represented by the wood-using industries of the country be pointed out. One inhabitant of every 100 forming the 100 million population of the United States is a wage earner whose earnings depend upon the uninterrupted supply of raw material from the forest. And if that wage earner is married and has a couple of children, that many more mouths to feed and bodies to clothe are directly affected by anything that tends to impair our forest resources.

Only the material side of the forest question has been touched upon here. Nothing has been said about the necessity of our forests for protecting the sources of water supply, for the recreation and health of those who should have the advantage of nature's playgrounds, or for maintaining an equable climate in different regions. These problems are not ethical but practical and urgently require attention.

From the economic as well as the human standpoint, are not our forests worth protecting?—protecting from improper utilization, careless logging, and criminal carelessness about fire? In the light of the statistics, every citizen should find it to his interest to support a constructive forestry program.

ROCK CREEK PARK WHERE STATESMEN MOTOR

The world's champion park for a motorist is Rock Creek Park, Washington, District of Columbia, the blooming capital of these broad and sovereign United States of America, writes Burt P. Garnett in Motor Life.

When somebody or other made some sort of a deal with Alexander Hamilton, first secretary of the Treasury, which resulted in the location of the capital on the Potomac River, between the sovereign states of Maryland and Virginia, that somebody proved he was a lover of nature and a person of unassailable taste in his appreciation of rocks and rills and templed hills and trees and birds and flowers.

Some argumentative person in Denver or Los Angeles or Portland, Oregon, will immediately put in a demand and make an effort to refute the foregoing information. Rocky Mountain folk and the peoples of the Pacific Coast always have had a hopeless sort of feeling about the rest of the country. They know that Estes Park and Lake Tahoe and the Columbia River country are much more beautiful than any other section of the world, but they have practically despaired of ever getting the national capital moved from Washington to Denver to Portland or Los Angeles, because the great masses of the people wouldn't understand. And it's rather too big to tackle to transport every voter in the country to these various places and show him the overpowering reasons why the capital should be moved.

Nevertheless, and in the almost certain knowledge that the foregoing statements will be flatly contradicted by loyal native sons of this state or that, Rock Creek Park is our candidate. We cast our vote right now and hereby adopt resolutions to the effect that whereas Congress in its wisdom in the year A. D. 1889 appropriated sums of money to purchase certain wooded area in the valley of Rock Creek to be set aside as a National Zoological Park, and,

Whereas, in the year A. D. 1880, Congress in its increasing wisdom appropriated certain other sums to buy other wooded area adjacent to and adjoining said National Zoological Park for the purpose of a public park, therefore be it resolved.

That Congress was decidedly hep to what was good for the nation, and, by heck, it deserves the thanks to the folk of this here District of Columbia, the A. A. A. et al. too numerous to mention.



MAMMY COTTONTAIL, RACING FOR HER LIFE, DARES A CROSSING ON THE THIN ICE OF THE RIVER

MAMMY COTTONTAIL AND TROUBLE.

BY ALLEN CHAFFEE

AUTHOR OF

I. "THE ADVENTURES OF TWINKLY EYES," THE LITTLE BLACK BEAR

(WITH ILLUSTRATION BY PETER DA RU)

MAMMY Cottontail, the little brown hare, found herself in a part of the woods she did not know. Never before had she dared to venture so far from her home in the Old Apple Orchard.

But one snowy day the Red Fox Pup had seen a hump of brown on the root of a beech tree, and the hump had suddenly moved!—And getting to wind-ward of the uncanny thing, he had found that it was the brown bunny.

The chase that followed had led to the icy bank of the river, where Mammy, racing for her life, dared a crossing on the thin ice, and where, light as she was, she barely made the other shore.

Then, sitting up straight, with her little brown paws crossed on her furry chest, and her pink-lined ears pointing forward, she had watched as the Fox broke through into the icy currant.

For his part, the Fox Pup was glad enough to be able to scramble back to the bank he had left, and trot off home-ward, with his plume of a tail dragging water-soaked and heavy behind him.

So far, so good! But Mammy now found herself in a strange new part of the woods.

Hiding, trembling, under a juniper bush, she waited till mid-afternoon, before her heart stopped hammering at her ribs.—Then, circling back to the river, she found to her dismay that the ice had softened, till there was nothing but a scum of floating mush to cross on.—She could never get back the way she had come!

Where could she hide from the many foes that might want rabbit for supper? She cast bulging eyes down the frosty aisles of trees.—Mercy! What was that strange scent on the wind? (A scent too faint for human nose to tell, yet warning enough for a bunny).

No time to explore! She must hide at once!—And with terrified leaps she was back under the juniper bush, where at least nothing could come on her from above.

For half an hour she crouched there. Then, so suddenly that she started in spite of herself, she heard a loud thump-thump-thump right behind her!

"Who are you?" the thumping heels of the newcomer signalled.

Then came a louder, angrier thump, three times repeated, which in rabbit code said as plainly as words: "Well, I like your nerve."

The Trail of the Weasel.

Mammy Cottontail stirred nervously. For again came that warning thump, which said in rabbit code: "I have first right to that juniper bush. And if you don't clear out in just three shakes of your left hind foot, you are going to get in bad with Madame Wood Hare."

Mammy had, without a doubt, stumbled upon the home of the other bunny. But where could she go? These woods were full of enemies. Should another fox set after her, where could she hide?

Rolling her eyes around pleadingly at Madame Wood Hare, she had just about decided that it was safer to chance the wrath of her unwilling hostess, when the newcomer gave her a surprise. Leaping straight at Mammy's head, Madame Wood Hare gave her such a blow across the nose with her long hind feet that Mammy whimpered with the pain of it.—Of course she had to vacate.

And before ever the owner of the form under the juniper bush could give her a second blow, the little brown hare was darting away in long, tired leaps through the wind-swept woods.

There was a patch of willow shrub by the river, and Mammy would have liked to wait for night-fall and make a dinner off the tender tips. But she was not long in finding out why Madame Wood Hare had turned her out. It was because she needed her own house to hide in.

For not far back in the woods, Mammy came across a trail that was new to her,—a delicate, lacy trail with the tiny, sharped-toed foot-prints of some long, slim creature with nails that could climb a tree trunk. And clinging fresh to those foot prints was the musky scent of a flesh-eating animal.

Mammy's teeth chattered with freight. It was undoubtedly the trail of a weasel, most dreaded of all her enemies!

Yes, there could be no mistake about it.—Here the tiny trail ran straight up a tree-trunk, and a blood-stained feather on the ground beneath told its own story of a chickadee's nest left empty.

And there,—high in the tree tops, was the sudden chattering of a terrified squirrel.—Good! The squirrel had reached his hole. He turned, presenting a mein of such long fierce teeth that the weasel must have hesitated as to whether it was quite worth while.

What should Mammy do? For the weasel might at any moment see her leaping through the snow, or cross her trail,—and then it would surely be all up with her.

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FORESTRY AND RECREATION IN THE PALISADES INTERSTATE PARK

BY GEORGE W. PERKINS, PRESIDENT

COMMISSIONERS OF THE PALISADES INTERSTATE PARK, STATE OF NEW YORK

FORESTRY has come to have a new meaning. Happily, no longer is the conception of American forestry limited to the commercial production of lumber. As Dean Hugh P. Baker, of the New York State College of Forestry, has recently remarked, the broader conception of forestry must ultimately embrace the social uses of forest domains for the health and recreational benefits they can yield. This ideal of forestry is one not new to the Commissioners of the Palisades Interstate Park, for they have, in their administration of this public park, applied, in a practical manner, the very heart of this broad and deeper meaning. The conservation movement, as an organized effort to preserve for economic and other reasons the natural resources, was new when the trap rock interests began to destroy the historic and ancient headlands, which for twelve miles adorn the west shore of the Hudson River from Fort Lee, opposite 129th Street, New York, to Piermont, N. Y. A writer, in *Puck*, many years ago said that if the Sphynx was situated on the west shore of the Hudson, the stone interests would not have hesitated to blast it to pieces to sell it by the yard! Had it not been for the interest of a group of people, these rocky embattlements, which are said by naturalists to have attained the ripe old age of thirty million years (and for all that still look young and hardy!), would have been reduced to the squalid docks, factories and dwellings which, on the south side of it, present such an ugly contrast to the region north, which was saved. It will always be said, to the lasting credit of the late

Mr. George W. Perkins, the author of this article, has for more than twenty years been the president of the New York State Commissioners of the Palisades Interstate Park. Despite his great interest in politics, finance and social endeavor, Mr. Perkins has personally directed the acquisition and utilization of the Palisades Park area. In this development he has, in addition to his own generous donations to the work, raised millions of dollars from private sources, to carry this interesting project forward.

Mr. Perkins' description of the use of various lands is a timely one and will provoke much thought in forestry circles. It will be remembered that it was Mr. Perkins who supported Mr. Roosevelt, who gave such an impetus to the whole conservation movement.—Editor.



A PATH ON THE PALISADES

Just ten minutes from Broadway—yes, unbelievable as this sounds, it is true and the region is becoming a familiar one to the people of New York. The Park offers varied opportunities to the pleasure seeker—strenuous exercise or the quiet enjoyment of all that there is of beauty.

J. Pierpont Morgan, that it was his generosity in contributing $125,000, which finally bought off the quarrying operations and stilled forever the drill which would have reduced these mighty ledges to a desert of waste.

Nearly twenty years of acquisition and development have now made possible, through legal enactment, the preservation forever of the Palisades from Fort Lee to Piermont, as a public park.

The administration of the Palisades was entrusted to a joint Commission appointed by the Governors of New



A CAMP WHERE UNDERNOURISHED BOYS ARE MADE WELL

Here is offered every possible enjoyment to the small boy of New York—and a wonderland of unknown joy and beauty, a new world, to many of the poorer youngsters of the city.

York and New Jersey, respectively. The members are: New York Commission—George W. Perkins, president; Franklin W. Hopkins, vice-president; J. Du Pratt White, secretary; Edward L. Partridge, treasurer; Richard V. Lindabury, William H. Porter, W. Averell Harriman, Frederick C. Sutro, Charles W. Baker, John J. Voorhees.

New Jersey Commission—Richard V. Lindabury, president; Edward L. Partridge, vice-president; J. Du Pratt White, secretary; Frederick C. Sutro, treasurer; George W. Perkins, Charles W. Baker, Myron W. Robinson, John J. Voorhees, William H. Porter, W. Averell Harriman.

This Commission is an unpaid, non-partisan group and derives its powers from legislative enactment.

How this area has come to fall within the broad conception which Dean Baker has described is evident in the following summary of the development for recreational uses to which this region has been put:

(a) Paths extending along the 12-mile front have been laid out, which rise and fall amid the pristine splendor of this region. Situated as it is within a ten-minute ferry ride from crowded Manhattan, this oasis serves as the breathing place for thousands of people annually.

(b) Pavilions constructed on the plan of preserving the natural characteristics of this region, have been erected where the visitor may rest quietly, to enjoy the remarkable scenic effects apparent from any place along these walks.

(c) Canoe and motor boat basins have been built, which serve to meet a need nowhere else met near this point for the water recreations highly valued by a large part of the population.

(d) The Henry Hudson Drive, now under construction, will pass through this region and give to the motorist an opportunity to enjoy this natural park area now available chiefly to walkers.

(e) A large bathing beach and bath house were opened last summer, affording accommodations for thousands to bathe in the Hudson.

(f) When first acquired the land at the base of the cliffs was hard to reach, which made difficult the problem of the use of the Palisades. As a result, for years the Commission has been changing all this and making land, until now spacious play-



A TYPICAL LAKESIDE PARTY

The Park is the mecca of New Yorkers on highdays and holidays—not to mention Saturday afternoons!

grounds and ample walks along the shore line have opened up this entire region to the public, and converted that which would otherwise have been merely for the delectation of the eye into a thing for the physical development and spiritual joys of the people.

Conscious of the good which has accrued as the result of the preservation and recreational uses of the Palisades

Park, the state transferred to the Commission a 700-acre tract of land, lying between West Point and Jones Point on the west shore of the Hudson, about forty miles north of New York, which was purchased for a prison site and later abandoned.

Mrs. E. H. Harriman, who owned vast tracts in the Arden Valley, near Tuxedo, at that time conceived the plan of sharing a part of her Arden estate with the public for the development of a public park. This beneficent idea took the form of a donation to the Palisades Park Commission of 10,000 acres of land and $1,000,000 in cash, which have made possible the opening up of a region of unrivalled beauty to the public for recreational purposes. There have been added to these 10,000 acres, various tracts purchased both from state funds and private contributions. Together with the Hook Mountains and Blauvelt acquisitions, the Palisades Interstate Park embraces an area of over 35,000 acres.

The chief problem which presented itself in the acquisition of this area was how to preserve the natural splendor of the forest, protect its wild life and develop its resources so that the public could secure the maximum benefit from such a development. How this was done and what has been accomplished forms a romantic chapter in park development in the United States. Briefly summarized, some of these accomplishments are as follows:

(a) The abandoned prison site was made into a vast playground. This is located at Bear Mountain. Over a half million people visited this section during the summer of 1919.

(b) Bear Mountain Inn was established with private funds, which supplies refreshments to hundreds of thousands annually.

(c) Hundreds of boats have been built by the Commissioners and during 1919 over 400,000 people enjoyed the free boating privileges at Hessian Lake.

(d) Tennis Courts, running tracks, baseball diamonds and handball courts have been developed on the plateau at the base of Bear Mountain, all for the free use of the public.

(e) Pavilions have been built which, in addition to serving as a place of rest and recreation, also care for thousands of tons of ice annually, harvested from the lakes, for the summer uses of the Park.

(f) Over 150 miles of fire trails have been laid out which, in addition to protecting the woodland, serve as a means of encouraging mountain hikes.

(g) A seventeen-mile drive, extending from Bear Mountain almost to the town of Tuxedo, has been built. Intersecting with the secondary roads of the Park, the drive makes a road system in the Park, which touches every important point.

(h) Seven artificial lakes have been made, while two others are in process of making, thus enhancing the value of the Park as a recreational area.



"K. P." AT A BOY SCOUT CAMP

Deeply engrossed in the absorbing task of separating the beloved "Murphy" from his skin, these boys will reap the benefits of self-reliance and vigor which come from camping in the woods. The ideal of the Commission has been to make possible an out-of-doors existence which will mean much to such boys of health, education and pleasure in future years.



A VIEW FROM THE PARK DRIVE

The Palisades Park comprises a region unrivalled for natural beauty. This is a spot on the drive, looking north up the Hudson.



A QUIET DAY IN THE PARK—A PANACEA FOR THE ILLS "ALL FLESH IS HEIR TO."

The Lake, the hills, the clouds, the Park itself—all combine in a formula for health generously dispensed freely by the State to its people.

(i) A system of transportation has been arranged for, so that thousands who do not own motor cars have an opportunity to go into the interior of the Park. Last summer thousands of passengers were carried in these omnibuses.

In the field of recreation, the most notable achievement of the Park is in its camp work. Last summer over 50,000 people, mostly children, spent an average of eight consecutive days each in the camps. Those interested in forestry will, I am sure, be particularly impressed with the plan, by which this recreational phase of the Commission's work has been developed. Rustic cabins, built in harmony with the surrounding country, have been placed unobtrusively, usually on the lakes. The logs from which the cabins were built were the dead chestnut trees in the forests; the lumber used comes from the Commission's own mills, three of which are operated and which, during a year, produced more than two million feet of lumber. Slabs—usually a waste product of the mill—have been used extensively in camp buildings, thus utilizing what would otherwise be a waste product and which, in no small measure, beautify the buildings. Water from protected sources is tapped and brought into the kitchen of the mess hall. Beaches have been made at the lakes, to make possible safe bathing for the timid. Over five million trees have been set out in the Park, so that the future may not be unprovided for by the needs of today.

To many people, camping has come to mean a lowering of the standard of decent living. Unsanitary living conditions have often been mistaken for the romance of primitive living. Irregular food habits have been looked upon as the necessary concomitant of camping. The ideal of the Commission has been to preserve all the self-reliance and vigor which come from camping in the woods, while at the same time, providing the means by which an out-of-doors existence is made to mean something in terms of health, education and pleasure.

I have always been impressed, in a deep study of the food problem, with the fact that people are not so much



THE FORCES OF NATURAL CONSERVATION AND HUMAN CONSERVATION TAKE COUNSEL BY THE FIRE-SIDE

George W. Perkins (seated, reading from left to right), for twenty years president of the New York State Palisades Park Commission; W. A. Welch, General Manager of the Park; Dr. Edward L. Partridge, a Commissioner and among the first to suggest the preservation of the Highlands of the Hudson, now the Bear Mountain Park region; Hon. George D. Pratt, Conservation Commissioner of the State of New York. (Standing) Edward F. Brown, of the Commission staff.

affected by the lack of an adequate supply of food as they are by the poor selection and poor preparation of the foods they use. We have, therefore, given particular pains to the development of a food service in the camps, which would yield a maximum of nourishment with a minimum of waste and exertion. The food problems in most of the camps, which are spread over a large area in the Harriman Park, are somewhat alike. The large food manufacturing facilities at Bear Mountain Inn have been harnessed to meet the needs of the camps, by cooking in a wholesome manner, on the basis of a standard dietary, and transporting the food in heat-retaining receptacles to the various camps, some of them seventeen miles from the point of manufacture. Over 150,000 meals were served in this way last summer, and it is with increasing satisfaction and success that this system is being developed for the following, among other, reasons:

(a) The Commission can purchase in large quantities, thus securing special concessions, taking advantage of discounts.
(b) A standard dietary can be followed with intelligent help.
(c) There is uniformity of weight and measure, avoiding waste.
(d) There is uniformity of quality as against the haphazard quality in cooking in individual camps for small numbers.
(e) During 1919, the Commissioners supplied 21 meals a week of balanced rations, yielding a minimum of 2,500 calories per day per child, at the rate of $4.00 per week.



A POINT OF HISTORIC INTEREST

This is the old Queensboro Furnace—dating from the days of the Revolution.

We are particularly interested in this phase of the scientific development of recreational facilities, because it makes possible camp operations at a minimum cost, while yielding the maximum good. I earnestly hope that in the thousands of school camps throughout the country, in the hundreds of labor camps at industrial centers, in the summer camps of forestry schools, it will be possible to follow a standard dietary, which redounds immeasurably to the health and efficiency of campers. In the industrial world, manufacturers are coming to realize the close relationship between efficiency and food, and there is a great demand, through the impetus of the war particularly, to supply wholesome food to workers in the interest of health, efficiency and production.

I have a great faith in the possibilities of the new conception of forestry. The era of discouragement, which is patent to all great movements, will pass, in my opinion, with the education in forestry which will come through contact with the people's forest preserves and public parks. It is in this that I believe the Palisades Park Commission, in bringing hundreds of thousands of people to the Park, who, in close contact with nature, come to love and reverence the living thing in the forest, is adding to the sum total of the conservation movement. While, in the Palisades Park, we are particularly interested in the recreational aspect, we feel, nevertheless, that the maximum utilization on a broad social plane of the recreational facilities in the Park depends chiefly upon the application of sound principles of forestry. Haphazard forestry, the denuding of our forests without providing for what we take away, must give way to the scientific program. We have not yet touched, in my opinion, the great relationship between the food supply of the country and the forests with their food products. It is for that reason, for example, that the Palisades Park Commission, during the last summer, welcomed an opportunity to co-operate with the New York State College of Forestry in a scientific survey of the fish in the lakes of the Palisades Park, and the possibility of their development for food and game purposes.

There is another side to the problem with which we grapple in the Palisades Park; more human and more interesting. It is what the little child, sun-starved in the tenement slums of the large cities, gets from his brief outing in the lap of nature. It is here where scientific conservation of our natural resources touches that deeper, more vital problem of the conservation of the human resources, and I want to speak briefly about it. There are hundreds of thousands of children in the large cities of the state, and for that matter in the whole country, who, owing to the economic condition of their parents, or some other cause, are hemmed in in windowless bed-rooms, and city streets, during the most impressionable period of their lives. Their later outlook of life is in no small measure determined by their contacts and impressions as they gather them up in the city streets and in the crowded slum districts, where perverted views play with the development of character. The Palisades Park

affords opportunity to social organizations to bring the children to the Park. Here the under-nourished, play-starved child finds in the verdant splendor of the woods a new life.

Never before was the need for strengthening the physical fibre of our young citizenship more pressing. The report of the examiners of the War Department as to the physical condition of recruits is, to say the least, a document which might well engage the attention of the preservers of the nation. The opportunities, therefore, given through the camps of the Palisades Park, at its health and recreation stations, are vital factors in the conservation movement. The work in this field, briefly summarized, consists of:

(a) Establishing standard camp plants, where approved social and civic organizations may bring their charges.

(b) Standardizing, as far as possible, the administration of these encampments, so that the child derives the largest benefit therefrom.

(c) Standardizing the dietary, in order to insure to each camp an adequate supply of nourishing food.

(d) Formulating recreational programs, in order to wholesomely occupy the time of the child.

(e) Formulating and carrying out a nature study—educational program through bird walks, under the leadership of bird experts; fishing excursions; hikes, etc.

(f) Developing the trails of the Commission in such a way, so that, through the use of unobtrusive signs, the walk becomes a study in nature's laboratory, rather than an aimless hike.

The extent of this operation can be gauged when it is remembered that these camps stretch from the lower Palisades region to the Highlands of the Hudson and west as far as Central Valley. In addition to the camps for the children who come from charity associations or settlements, three lakes are devoted to Boy Scout activities, the annual daily census of this group during this summer having been 1,600 boys. There are also the camps for self-supporting working girls, who pay moderate sums, for which they procure all and more benefits than are derived from the conventional, commercial boarding house.

THE CALIFORNIA GRAY SQUIRREL AN ENEMY TO THE DOUGLAS FIR

BY J. HOOPER BOWLES

THE California Gray Squirrel, sometimes known as the Oregon Gray Squirrel, has been a resident of the State of Washington ever since 1896 to my personal knowledge. At that time it was by no means common, largely owing to lack of legal protection, in my opinion. Many people claim that they were introduced into the state, but it seems much more probable to me that they may always have been here in limited numbers. It would be a comparatively small matter for animals of such well known migratory propensities as the large squirrels to wander from Oregon up into this state.

These animals seem to be confined almost exclusively to what I call the prairie districts. This type of country was, a comparatively few years ago, undoubtedly almost devoid of any timber except the oak, but has been steadily encroached upon by the Douglas Fir. This resulted in the death of the oaks. The same process is going on today, another case of survival of the fittest, I presume. This type of country has little or no small undergrowth, such as the Sal-lal and ferns, and is peculiarly suited to the Gray Squirrels. The line where the prairie country meets the mountain country, with its dense undergrowth, is exceedingly abrupt, but none of this species of squirrel will be found over that line, unless by accident.

About ten years ago, I am uncertain of the exact date, the squirrels were given legal protection, the result being an immense increase in their numbers. Up to that time it seems probable that their destruction of the firs was little more than nominal, or I should almost certainly have noticed it. In a very short time, however, the results became most glaringly evident, until, at the time of this writing, hundreds of thousands of dollars worth of timber has probably been destroyed. In many large groves a low estimate would place two-thirds of the trees with the tops dead, or dying, making the destruction of the rest of the tree merely a matter of a short time.

So far as my observations have gone the Douglas Fir is the only tree attacked, this being confined to what is known as the second growth timber. The tree is girdled of its outer bark, the objective being the inner bark and soft wood just underneath. I know this to be a fact, because I have shot the squirrel at its work and found the stomach to be packed with the material above mentioned. Small trees are liable to be attacked close to the ground and girdled to the top, but trees of from twenty-five to a hundred feet in height usually have only the upper half injured. Girdling usually commences, I believe, about three-quarters way up the tree, the squirrels then working up and down. It is probable that they begin this work when the sap starts running in the spring, as I have never seen any signs of it before January at earliest, and it is almost altogether discontinued in June. Signs of their work at once become evident, as strips of bark about six inches long litter the ground in all directions.

SHOULD OUR CITY TREES BE LABELED?

BY ALBERT A. HANSEN

THE value of trees on our city streets has never been more fully emphasized than during the last decade. Due perhaps to this movement we now frequently hear of the city forester, a term which would have been quite foreign to us not many years ago.

The planting of trees on the city streets is now such an integral part of the "city beautiful" that the present time seems ripe for a closely allied movement which will tend, perhaps, to enhance the value of the plants, namely, a movement for the proper labeling of all the trees which now beautify our city highways and adorn the public squares and other places.

To the average street pedestrian a tree is just a tree; he gives little thought to the name of the plant because he knows well that reliable information on the subject is not readily to be obtained. All of us, however, are interested in plants, an interest which seems born within us. The average person is always desirous of calling things by their correct name, a feature characteristic especially of children. That the proper naming of plants does present a popular interest is fully attested to by the interested groups which so frequently congregate around the labels in such places as botanical gardens and parks where trees are thoroughly placarded. This fact was rather forcibly brought to the writer's attention during the past summer while spending an afternoon in one of the beautiful parks of Chicago where the trees were all named with artistic labels. The interest created was well shown by the number of people who paused to read the signs and then took a second glance at the specimen as though to more firmly fix its characteristics in mind. Walking through the capitol grounds in Washington while the linden was in fruit, the writer was amused to see a group of children gather several of the curious bracted fruits and carry them to a nearby policeman for identification! Such procedure, of course, would be rendered entirely unnecessary if the children's thirst for knowledge could have been satisfied by glancing at a label upon the trunk of the fruiting linden.



A RECOMMENDED TYPE OF TREE LABEL

This label bears the common name of the tree as well as its scientific name and native habitat and it is made of heavy zinc.

People enjoy labels; they always seem to attract the eye and interest the reader. Oftentimes there is the necessity of wasting a few minutes perhaps at the railroad station, or on the street corner while waiting for the car; time may fall upon our hands in a thousand different ways. Could these otherwise wasted moments be more profitably spent than in the study of the surrounding vegetation? This study may be aided greatly by the use of neat and attractive labels, and an interest be thus created which might prove an asset in the form of increased civic pride. The influence might be far-reaching; let us say, for instance, that a certain tree causes a particularly strong impression because of beauty of foliage, shape or any other of the many characters which constitute the beauty of trees. A desire may thus be created for the possession of similar trees for planting around the home or possibly along the neighborhood street. The desire can be more readily gratified if the label conveys the information by which more of the same kind may be obtained.

A knowledge of the names of plants is woefully lacking in city-dwellers, even among the well educated classes. We are reminded of the public school class of children no member of which could correctly name all five of such common plants as the buttercup, rose, goldenrod, columbine, and daisy! The proper labeling of plants would transform the city into a huge botanical garden; the resulting educational value would prove invaluable. A reasonable familiarity would also tend to arouse a desire to protect the plants and such sights as the mutilation of trees due to telegraph wires, the biting of horses and a dozen other causes, would perhaps be rendered rare because of the pressure of public opinion. The effect of reading a label upon an unknown tree is much the same as being introduced to a stranger; it gives one a feeling of kindly interest that increases as the new found friend is more frequently met, because it is human nature to take more interest in the things we know by name rather than by mere sight. Not the least attractive

feature of this idea is its comparative inexpensiveness. The value of a single city tree is variously estimated in sums ranging into the hundreds of dollars. Let us say that the average value of an urban tree is fifty dollars and the cost of the label is twenty-five cents. Is not the value of that tree increased far more than the fraction of its value represented by the financial investment in the label?

We hear much lately of university extension education. We learn of the extending of education into the shop, on the farm and to the factory. Here seems to be long-neglected opportunity for an inexpensive form of extension education which should touch the large masses of the people from the poorest to the wealthiest, for the streets are used by all. So far as the writer has been able to ascertain, not a single large city in America has adopted the idea of labeling its trees.

One day a year, Arbor Day, has now been set aside for the purpose of planting trees; why cannot this idea be further extended by increasing the value of the planted trees with appropriate labels? There are many localities where sufficient plantings have already been made; it is suggested that Arbor Day be celebrated in such places by labeling the trees which have already been planted and thereby materially increase their value to the community. A widespread public interest in trees will do much toward the proper planting of many of the frequently traveled rural highways whose beauties would be so greatly enhanced by the addition of bordering lanes of beautiful shade trees.

The labeling need not be restricted to trees; many cities and towns are richly provided with public squares and parks well planted with handsome shrubs. Surely the value of these plants will be greatly increased if labels bearing their names are placed upon their branches. Perhaps the best method of attempting such an undertaking is by means of municipal appropriations; and the actual work supervised by either the city forester, the park commission or any similar body whose duty it is to care for and protect the city's plants.

It is suggested that the data contained upon the label should include at least three things, namely, the common name, scientific name and place of nativity of the labeled plant. Such labels should be neat and durable; they may be either the expensive enameled kind or else a well-designed sheet zinc type.

As an inexpensive means of increasing civic pride and increasing popular knowledge concerning plants, the labeling of our city trees presents an apparently long-neglected opportunity which should soon be taken advantage of.

It has been said that he who plants a tree is greater than he who takes a city. Might this not be changed so as to include the one who labels a tree?

WINTER GREENERY

BY BESSIE L. PUTNAM

STRANGE how the majority of people take it for granted that there is nothing worth looking for in the woods in winter! Of course, if they only looked, they would find beautiful things in abundance, with plenty of woodland greenery when the snows permit it to be seen. And this applies out of the mountain districts where the laurel and rhododendron dominate; out of the zone of pines and hemlocks.

In the deciduous woods we shall have to look down to the ground perhaps, but in many places the Christmas fern is found in abundance, rivaling the Boston fern of the greenhouse in outline and verdure, if not in the length of the fronds. This species, *Aspidium achrostichoides,* thrives well in cultivation if given a partially shaded location, and is certainly a valuable acquisition.

The partridge berry, *Mitchella repens,* abounds in many places, its bright scarlet berries being most conspicuous unless the grouse has been ahead of you and captured them for dessert. Gray says that one may expect an albino in almost any form of vegetation, but expresses surprise as well as delight upon receipt of a white form of this berry. It seems almost unbelievable, and yet, we have white blackberries, despite the incongruity in nomenclature! A pleasing experiment is to place a few of the vines before the fire, where the heat will not quite burn them, and note how—as the air expands between the two layers of each leaf, they swell up like miniature puffballs. The most interesting feature in this berry is the two eyes, mark of its origin from a twin flower.

Several of the orchids present interesting phases of life, even in winter, the most noticeable being *Goodyera pubescens,* with its numerous rosettes of white-veined leaves hugging the ground. The network of veins with which they are covered would lead the uninitiated to insist that this can be no orchid, since it is in the class of parallel-veined plants. But a glance at the lower side of the leaf at once discloses the delusion.

Then there is the Putty-Root, *Aplectrum Hyemale,* with green and white leaves, glistening, and very much fresher in appearance than we shall ever see them again. Our foremothers found in the mucilagenous corms a satisfactory source for mending broken china, hence the popular name. The corms live two or three years, consequently that of last year is attached by a string ligament to the new bulb, and the name Adam and Eve is thus apparent.

Delicate ferns may still be found green in sheltered places, their fronds with a deeper coloring because of the moisture in air and ground. A stray dandelion, the flower of all seasons, may be looked for in open pastures during the winter thaw. With the February breaking of ice, the strudy Skunk Cabbage sends up its purplish caps, the odor as well as the color being suited to the carion loving fly. But do not pass it in contempt. It is not a vile plant, despite its odor; and the way in which the central spadix is covered with a mosaic floral design in creamy white is well worth closer examination.

THE TREE

THE MEMORIAL THAT LIVES

By CHARLES LATHROP PACK

President of the American Forestry Association

WASHINGTON, D. C.

PLANT a tree, that glorious sign of Nature to the world that life is ever renewing. Plant the "tree that looks at God all day and lifts its leafy arms to pray," and in the planting you will have erected the finest of all monuments—not alone to the hero of a war—not alone to mark a date—not alone as shelter for generations to come—but the finest of all monuments to yourself. In the planting of a tree you will leave behind a living sentinel that you gave to Nature that she might give back again in abundance to others who come after you. It is a great thing—the planting of a tree. Napoleon, in the heat and stress of a campaign, ordered that a military highway be turned aside that one of Nature's greatest wonders might be saved. The forests of France saved her and civilization in the World War. Much of the history of the world has been made beneath trees and much of it has been written because of trees.



THE PRINCE OF WALES PLANTING AN ENGLISH ELM IN CENTRAL PARK, NEW YORK CITY. CHARLES LATHROP PACK, PRESIDENT OF THE AMERICAN FORESTRY ASSOCIATION, AT THE RIGHT OF THE TREE.

With the signing of the Armistice the American Forestry Association proposed the memorial tree idea and it met with instant approval. Since then trees have been planted by individuals, schools, colleges, churches, patriotic organizations. These trees were planted not alone for the man who gave his life to his country, but to honor those who offered their lives. Memorials of many forms will be adopted, but each should be given the proper setting of memorial trees.

Tree planting has taken many phases. In some places hundreds of acres have been purchased by a municipality and memorial trees will be placed for every one in war service from a given county. Another phase is the "Roads of Remembrance" idea of the American Forestry Association. This is roadside tree planting. This has been taken up by women's clubs, automobile clubs and the motor industry. We are face to face with an opportunity, as a great road building program is planned by the states such as will not come to us again. With the "Roads of Remembrance" idea the people of this country have the chance to make the roads beautiful. Throughout the land, tree planting associations are being organized in the schools in co-operation with the American Forestry Association. It is easy to visualize what each school yard will mean to this generation of children because of this tree planting.

Memorial tree planting has been successful because trees, their planting and care, have always been a subject of great interest. To plant a tree is a commendable act. To give timely attention to trees after they have been planted is fully as praiseworthy as their planting. To refrain from removing trees from a place where they are unquestionably needed is another mark of the interest of a person in making the land a good place in which to live.

Now this matter of the planting and the care of trees can be readily promoted by anyone. There are a few fundamental principles underlying the various simple operations. But the entire affair is mostly a matter of

the exercise of common sense. Fortunately the majority of us can lay claim to a fair share of this quality. There are certain conditions which are met and known requirements of tree growth that are satisfied. By a little attention to the features of tree planting and care anyone may make a success of tree planting operations and, furthermore, may care intelligently for trees after they have been planted.

The Value of Planting Trees.

The value of planting trees is so apparent to our federal and state governments that there are planted on our public lands each year millions of tree seedlings and transplants. No less important and valuable is the planting of trees by individuals along streets, on country roadsides, in home grounds, on the public school lawn and in various other places where trees would add a touch of beauty and nature to otherwise treeless areas.

Providing shelter and shade is one of the chief values of tree planting. In these days of the scarcity and the high price of fuel for our homes and schools, trees are a welcome asset as windbreaks. A group of trees, located on the windward side of a building, act as a protection against the severe blasts of winter. Surely, no one can fail to remember the grateful shade of trees which has made the great heat of summer more bearable. The attractiveness of any place is increased by the presence of a few trees. These must be of appropriate varieties like the elm or the sycamore for low and fairly moist land or oak and pine for dry and sandy situations. Also their location with reference to the other features of the place and with reference to the use of the area must be suitable, otherwise their beauty will not be of the highest order. With a little care and consideration the proper kind of trees may be located on home grounds, streets, the school lawn or the park to enhance the attractiveness of these places.



LINDENS PLANTED ON THE INSIDE OF THE SIDEWALK TO AVOID THE OVERHEAD WIRES

It is widely known among scientists that trees tend to cool and to purify the air. Our public forests have been greatly used as health resorts because of the purity and health giving qualities of tree covered areas. But the effect of small groups of trees and even of individual trees in cooling and purifying the air is sufficient for us to plant them in few numbers for this special value.

The maintenance of bird-life is of utmost importance to the prosperity of our country. Without birds our agriculture would be impossible. And without trees to furnish nesting places the land would soon be destitute of the beneficial birds. Planting trees, therefore, is valuable in furnishing homes for birds.

The planting of trees awakens and instills an interest in nature. This interest is helpful to the enjoyment of our surroundings. Many persons have first had their personal touch with plant life and the work of nature through the planting of trees. This beginning has led to developments that have opened new fields of delight.

The value of trees in dollars and cents is one that is almost impossible to calculate accurately. It is universally accepted that trees add to the monetary value of property. Houses on a well shaded street will command more rent than the same type of structure on a treeless street. A home surrounded by dignified trees will invariably bring more money in the open market than the same house on a barren tract.

The Best Kind of Trees for Planting.

The first question that comes up when one is considering the planting of trees is what kind shall be selected. The answer to this depends upon a few factors which can easily be ascertained. One of the controlling factors is the character of the soil in which the tree must grow. There are a few trees, such as the American elm, that are adaptable to a wide range of soils. There are other trees, such as the tulip tree, which require a special condition of soil in which to thrive. In this case a deep, rich soil is essential. Then climate is to be considered. Anyone knows that a live oak grows best in the South and that the sugar maple does best in New England and the Northeast. It is safest to use the kind of trees that are already thriving in their growth in the neighborhood in which the proposed trees are to be planted.

Even with the general soil conditions and the matter of climatic requirements well satisfied, the special situation to be occupied by the tree should be considered. If there is small space which can be devoted to the future development of the tree it would not be satisfactory to plant one which will attain huge proportions. The location or situation of the tree may determine its selection as much as soil and climate.

More than any other determining feature in tree selection is the purpose for which the tree is planted or is to

serve. A spruce will be less successful for shade production than an elm, but the spruce is admirable for shelter. When a tree is part of the landscape scheme of a place it should be co-ordinated and fitted in with the other trees or additional objects in the surroundings.

Trees for city street planting may be of the same kind for a dozen blocks and must be evenly spaced. When trees are planted along a country roadside it is better to have them in groups of a few kinds and informally located.

There is another consideration that is often not given sufficient thought at the time of selecting trees for planting and that is the permanency of the kinds of trees. For this reason entire streets, sometimes a whole town, are planted with short-lived and otherwise inferior trees.

It is much more desirable to plant trees of considerable permanency such as oak and sycamore than to select quick growing, but also fast maturing, trees such as silver maple and many of the poplars.

The cultural requirements of some trees are less exacting than others. It is well to select those that will require no more attention than the planter is prepared to give them. Beyond the first two or three years after planting, the oaks, maples, elms and sycamores require very little cultural treatment.



RED OAKS ARE ADMIRABLE FOR STREET TREES BEING STURDY AND REQUIRING LITTLE ATTENTION

Obtaining the Stock.

In sections where the surrounding woodlands offer countless young evergreens and saplings at no more trouble than the digging, it has been customary for tree planters to go to nearby woodlots to obtain the stock for planting on streets, home grounds, school grounds and along country roadsides. This method has one special feature to commend its practice. It provides a variety of trees that are a product of the locality. But it is an improvement on this practice to buy from some nearby nurseryman the same variety of trees especially grown for the purpose of transplanting. In the nursery the trees are handled with the express purpose of preparing them for transplanting. This method of handling furnishes a tree that begins growth with less set-back than when the same size tree is taken directly from the woods.

There has been perfected special machinery for the transplanting of large trees from woodlands but this is quite aside from the ordinary tree planting. As a general rule a much larger size tree can be safely taken from a nursery for transplanting than from a woodland.

As to the size and shape of the tree to use in planting, to a great extent this will depend upon the kind of tree that is used and especially whether evergreen or deciduous. In general, nursery-grown evergreen trees up to five feet in height and deciduous trees of the same quality up to twelve feet in height are the best sizes to plant. In case of deciduous trees for lawns, either in groups or planted singly, there is not the demand for regularity and uniformity in shape as is required of trees for a street. In fact, it is preferable to have a group of trees, the individuals of which are not too regular in their shapes, for lawn or country road planting. For a street a tree which has its lowest branches trimmed away to twelve or fourteen feet from the ground after the tree has grown to a fair size is the desired shape. On a lawn the lower branches may be not more than four feet from the ground. In the case of evergreen trees the lowest branches should rarely be cut away.

Preparations for Planting.

After obtaining the trees certain preparations should be made for planting. Whether the tree is taken from a nearby woodland or is purchased from a nursery, its roots must be carefully protected both as regards severe drying and as to injury from scraping and bruises. When trees are shipped from a nursery their roots are covered with moist material. Keep this covering around the roots until immediately before planting. The roots of the trees dug from the woodland should be similarly covered and protected. The exposure of the uncovered roots of trees for five minutes may be sufficient to injure the tree beyond recovery. Care in protection of the roots from sun, dry air and wind will be amply rewarded in the performance of the trees after proper planting.

While some trees will undoubtedly grow in a poor soil after they have become established, there is no advantage in starting the trees in anything except the best garden soil. Usually that referred to as "top soil" is the kind to have on hand in sufficient quantity to plant the trees.

Unless the trees have been given better than ordinary handling in the operations of transplanting, their roots will need some trimming. The broken and badly bruised roots should be pruned with a clean cut. The top of the tree can be shaped up at this time. All of this operation of pruning should be made with a sharp pruner such as can be secured at any hardware store if it is

not already among the everyday tools of the planter.

In order to do the planting properly an equipment of tools in addition to the pruning shears is necessary. This equipment would properly consist of a spade for excavating the hole, a pointed stick such as a rake handle for



TREES, DECIDUOUS AND EVERGREEN, MAY BE GROUPED ON THE LAWN

filling the soil in around the branches of the roots, and a tamper to firm the earth. Where the ground is firm and hard a pick and a shovel may be added to the outfit. When the soil is very dry and the weather quite warm, it is well to have some receptacle such as a barrel, half filled with a mixture of water and earth, in which the roots of the tree may be puddled before placing in the excavation made recently for them.

Planting the Trees.

The two normal seasons for planting deciduous trees are spring and fall. The advocates for either season have many arguments to advance on the success of their operations; but as a rule it is safe to say that all trees except the evergreens may be planted at any time during the dormant period it is possible to work the soil, *i. e.*, when not frozen. This period begins with the dropping of the foliage in the autumn and ends when the buds burst open in the spring. The inexperienced planter will find the early spring the better for tree planting in the northern states. Evergreens are usually planted in late spring and during the latter part of August and the first part of September. If large balls of earth are secured intact around the roots, evergreens may be planted successfully at times earlier and later than the above seasons. The day to select, where this is possible, is a cool, cloudy one. On other days greater care must be devoted to the details of planting to prevent the drying out of the roots through the necessary handling of the plants.

The size and shape of the excavation for the individual trees should be large enough in width and length to receive the roots of the tree extended in their natural positions. The depth of the hole should be more than enough to receive the roots in the same manner. There should be space for a layer of six inches of good loam before the roots are placed in the hole. Then when the "top soil" is carefully worked among the fine roots the tree should be three inches lower than it was in its nursery or woodland situation. In working the soil around the roots no air spaces should be left when the tree is finally planted. In other words the soil should be firmly and carefully packed with the pointed stick and the tamper so that the tree can not be shaken from its position. A popular and excellent way to get the soil properly around and among the roots is to soak the soil in the excavation.

The spacing of trees is something that can not be governed by fixed rules. Street trees may be placed from thirty to eighty feet apart, depending upon the variety used. Catalpa and lombardy poplars, which are not very commendable for street use, may be planted at the minimum distance given above while sycamore and elm would require the maximum distance.



LOMBARDY POPLARS PLANTED BETWEEN MORE PERMANENT OAKS ARE ATTRACTIVE

For lawn planting in groups the trees may be placed as near each other as ten feet. For windbreak planting the individual trees are from four to six feet apart. For all purposes other than along streets it is better to plant

Register Your Memorial Trees In the National Honor Roll of the American Forestry Association.

the trees rather close with the idea of cutting out the crowding ones when it is necessary.

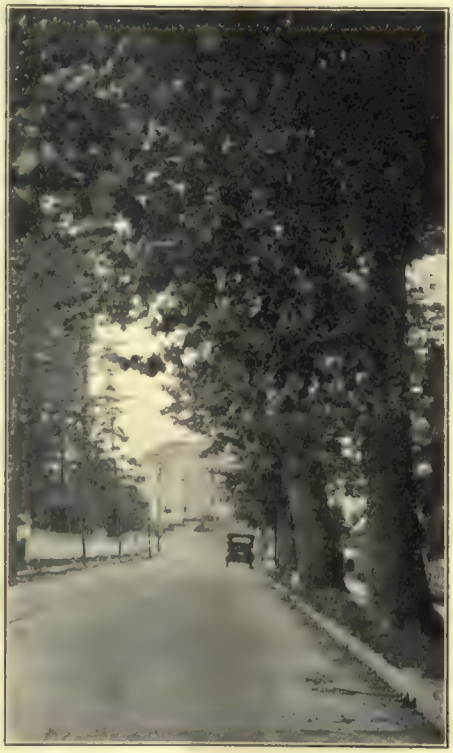
In the event that the top of the tree was not pruned before planting to correspond to the amount of root system, this should be done now. It is liable to be the case that too little pruning of the top is given rather than too much. In fact, many successful planters remove all of the side branches of a deciduous tree, leaving only the main shoot or leader at the time of planting. Above all, do not prune back or remove the leader of the deciduous tree. Evergreen trees need no top pruning at time of transplanting.

Care After Planting.

Regardless of how thoughtfully the trees have been selected and how thoroughly the planting has been done, there remains intelligent care to be bestowed upon the trees to have them live and thrive. Many planters have been disappointed with the results of their work because they considered their job completed when the last shovel of soil was placed around the tree. Trees in situations exposed to strong winds, and always along streets, should be staked with a strong pole reaching up to their first branches when the pole is driven into the soil two feet in depth. In addition to the stake, street trees need some sort of a guard. There are many types of guards on the market and examples of good types may be found in any progressive community. Trees planted in groups and where they receive natural protection will not need a stake to maintain them in an upright position.



THE WHITE PINE IS ONE OF THE BEST EVERGREENS FOR SHADE TREE PLANTING



THE SYCAMORE IS A MAGNIFICENT TREE FOR STREET PLANTING

In the middle west or other districts where there are hot winds during early summer the surface of smooth bark trees such as the linden or basswood will need protection of their trunks or main stems. This protection may be afforded by plastering with a thin coating of mud, winding burlap or other cloth, or by the use of tar paper. In almost any section of the country the soil around the base of newly planted trees will need some cultivation the first year or two during the drought season. If trees are planted in large groups ordinary cultivation may be given. When the trees are planted as specimens or are scattered, such as along the street, the digging of the soil in a circle around the tree to a depth of three or four inches will aid the tree in its growth.



THE SOIL MUST BE HELD INTACT WITH THE ROOTS IN TREE MOVING

In order to conserve the moisture in the soil around newly planted trees the ground may be mulched with leaves, straw, litter or a layer of dust formed by stirring and pulverizing the soil to a depth of an inch. This will obviate watering in most cases. Only under rare conditions will it be necessary to water or irrigate trees when mulching is practiced. Of course, this does not apply to the districts where all cultivated trees must be artificially watered by irrigation.

Is There a Famous Tree In Your Town? The American Forestry Association Wants To Know About It.

As trees grow they will need pruning. This requirement can be met by going over the trees during the summer when the amount of top to be removed can be more easily determined than in the winter months. The winter is a favorable time for pruning, however, and is devoted to this work by many city foresters and arborists. The matter of pruning is one which should be attended to annually. The amount of pruning is one of individual



THE AMERICAN FORESTRY ASSOCIATION'S TREE MARKER IN BRONZE

judgment but should be based on the shape of the tree desired to be produced.

Injuries to Trees.

There are a host of dangers to which trees are subjected in their struggle for existance. The injuries resulting from these dangers are not ordinarily so severe as to deter anyone in planting trees. Neither are the injuries so intricate that damaged trees should be left to their fate, which is a premature loss. Most injuries result from insect attack and tree diseases. There are other sources of injury such as electricity, gas and improper trimming of the tops to make room for overhead wires.

Insect Enemies.

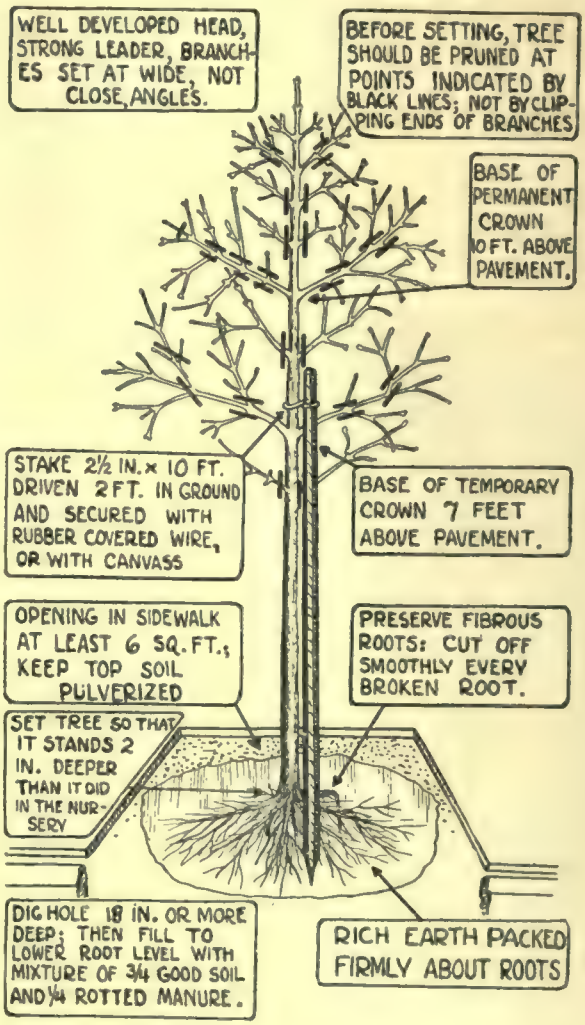
According to the habits of tree insect enemies, there are two common methods employed in combating them. Insects which feed on the leaves of trees, such as caterpillars, are successfully combated by the spraying of the foliage with solution of arsenate of lead during the period when the insects are feeding. This is in general the best method of holding in control this class of insects, although special means have to be employed for unusual cases.

The other general class of insects, such as plant lice and scales, which do not devour the foliage but suck the juices of the tree, have to be handled by a different method. The treatment for this class is the use of some contact poison which kills the insects it touches. Solutions of soap and kerosene are employed for this purpose.

A solution of arsenate of lead is made as follows: Arsenate of soda (50% strength), 4 ounces; acetate of lead, 11 ounces; water, 100 gallons. Dissolve the arsenate of soda in two quarts of water in a wooden pail, the acetate of lead in four quarts of water in another wooden pail. Mix these with the rest of the water.

For elm-leaf beetle use ten instead of one hundred gallons of water. In spraying many trees twice the strength, or one-half the water, of above formula will be better.

Prepared arsenates of lead are procurable on the market and where only a small amount of spraying is



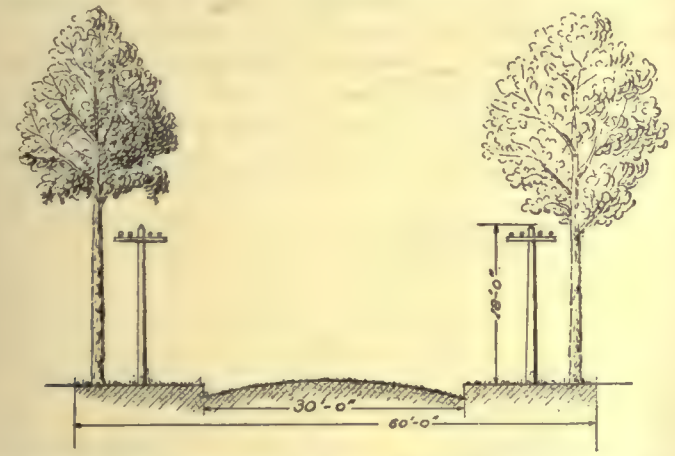
OBSERVE THESE INSTRUCTIONS IN PLANTING

to be done it is better to use these ready made materials.

Kerosene emulsion is made of hard soap, ½ pound; water, 1 gallon; kerosene, 2 gallons. Dissolve the soap in boiling water. *Remove from the fire* and add the kerosene while the solution is warm. Agitate, or churn with spray pump, until emulsion is creamy white. Use this as stock. For scale insects in the winter, spray with a 25-20% solution, *i. e.*, one part in 4 or 5 parts of water; in summer to control lice and for general use against scale insects apply a 10% solution, 1 part stock to 10

parts water. Do not use on muggy days or in wet weather.

There are on the market a number of good commercial mixtures. These should be used on shade trees according to directions which come on the containers. Lime-sulphuric wash is to be used only when trees are in dormant condition. In other words, do not spray when the foliage is developed on the trees.



HOW TO PLANT ROADSIDE TREES IN THE PUBLIC HIGHWAY WHERE IT IS NECESSARY TO HAVE TELEGRAPH OR TELEPHONE POLES

Three points in spraying are: (1) Be sure the spray material is properly made. (2) Apply thoroughly. (3) Apply at proper time.

The most common diseases of shade trees are known as fungi. They live upon the tissue of other plants, living or dead. Some of the fungi are microscopic in size, while others are larger, thread-like structures, with large fruiting bodies commonly known as mushrooms or toadstools.

The majority of fungus diseases are of little importance to shade tree growers. A few of the diseases are highly destructive. In the east the most destructive tree disease that can be mentioned is the chestnut blight. The white pine blister rust is another well known, though even more recent, forest tree disease.

The lime sulphur wash may be used as a fungicide in addition to its value for combating scales. The control of fungus diseases should be by preventative measures. This is given by covering all freshly made wounds on trees with a heavy lead paint and otherwise keeping the trees in healthy condition.

Telephone and electric light wires do some harm by being in contact with the branches of trees. This harm can be reduced by proper insulating of the wires. Where large quantities of wires are present they should be placed underground. Without question the greater damage to trees from overhead wires is an indirect one. This is caused by the wholesale cutting of the tops of trees to prevent them from touching the wires.

Illuminating gas has caused the death of many street trees on account of its poisoning of the soil. The only remedy is to replant. It may be necessary to remove the gas impregnated soil and replace with a fresh supply.

During the past fifteen years much attention has been given to the repair of injured trees through the methods of tree surgery. The principal operations that are performed in this repair work are antiseptical filling of decayed cavities, the bracing of weakened parts of trees and the correcting of natural deformities. In every region there are persons skilled in this practice who may be secured for the improvement of trees in this respect.

Selected List of Trees.

For New England States, New York, Pennsylvania, New Jersey, Ohio, West Virginia, Kentucky, Indiana, Michigan, Illinois, Missouri and Iowa:

Deciduous Trees.

Sugar maple	White ash	Pin oak
Norway maple	American white elm	American linden
Scarlet maple	Red oak	Scarlet oak
Green ash	White oak	

Evergreen Trees.

White spruce	White pine	Hemlock
Colorado blue spruce	Scotch pine	Arbor vitae
	Balsam pine	

For Delaware, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Tennessee, Florida, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma and Texas:

Tulip	Norway maple	Willow oak
Sycamore	Scarlet maple	White pine
Pin oak	Red elm	Longleaf pine
Scarlet oak	American white elm	Magnolia
White oak	Kentucky coffee tree	Live oak
Black oak	American linden	Cedar of Lebanon
Red oak	Red gum	American holly
White ash	Black gum	
Bald cypress	Hackberry	

For Wisconsin, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Colorado, Wyoming, Montana and Idaho:

Bur oak	Hackberry	Austrian pine
Linden	Honey locust	White pine
Norway maple	Black locust	Norway spruce
Green ash		Colorado blue spruce
Wild cherry	Less desirable:	White spruce
Larch	Cottonwood	Red cedar
American elm	Box elder	Arbor vitae
Black walnut	Scotch pine	

For New Mexico, Arizona, Utah and Nevada:

Hackberry	Bur oak	Box elder
Honey locust	Valley cottonwood	Arbor vitae
Green ash	Mountain cotton-	Deodar cedar
American elm	wood	Box
Black locust	Mountain ash	Euonymus

For California, Oregon and Washington:

Deciduous Trees.

COAST REGION

Large leaved maple	European linden	Sycamore
		Weeping willow

COLUMBIA BASIN

Norway maple	Sycamore	Russian poplar
European linden	Green ash	White willow
	Silver poplar	

Evergreens.

Deodar cedar	Monterey cypress	Lawson cypress
Monterey pine		Bigtree

The Tree—The Memorial That Lives

Tree planting is not a thing of this year or of the next. Indeed it will be well to plant the memorial tree every year. The people are just awakening to the possibilities of tree planting. The trees are monuments with a meaning for they live gloriously just as did those for whom they are planted. The glory is the thing to tell to the world. Our sorrow is a private, personal affair and needs no telling to the world in bronze or stone. Instead let us plant trees to tell of their glory, for that is the way they who went forth to the great adventure would have it.

And if we do not plant trees as memorials let us plant them for shade, for scenic value, to beautify streets or lawns, for parks, and for communal woodlands. All serve a purpose.

Plant the tree with an appropriate ceremony. The character of the ceremony depends upon the character of the planting. If single trees or groups of memorial trees are planted the program given below will be of service. If roadside planting is done by a community or an organization a public meeting to inaugurate the work should be held and a program of appropriate addresses made. If shade trees in garden or street are planted, of course, no program is necessary but there should always be some kind of formal ceremony when a school, a club, an organization or a community participates in a planting.

TREE PLANTING PROGRAM

THE PLANTING SONG

Tune: America

God save these trees we plant,
And to all nature grant
Sunshine and rain.
Let not their branches fade,
Save them from ax and spade,
Save them for joy and shade—
Guarding the plain.

When they are ripe to fall,
Neighbored by trees as tall,
Shape them for good.
Shape them to bench and stool,
Shape them to square and rule,
Shape them for home and school,
God bless the wood.

Lord of the earth and sea,
Prosper our planted trees,
Save with Thy might,
Save us from indolence,
Waste and improvidence,
And in Thy excellence,
Lead us aright.

Address—Upon Occasion for the Planting

RECITATION—"TREES"

Poem by Joyce Kilmer, Who Gave his Life in France

I think that I shall never see
A poem lovely as a tree.

A tree whose hungry mouth is prest
Against the earth's sweet flowing breast.

A tree that looks at God all day
And lifts her leafy arms to pray.

A tree that may in summer wear
A nest of robins in her hair.

Upon whose bosom snow has lain;
Who intimately lives with rain.

Poems are made by fools like me,
But only God can make a tree.

Planting of the Tree or Trees

WHAT THE TREES TEACH US

Fourteen Rhymes for Individual Recitations

I am taught by the Oak to be rugged and strong
In defense of the right, in defiance of wrong.

I have learned from the Maple, that beauty to win
The love of all hearts, must have sweetness within.

The Beech, with its branches wide-spreading and low,
Awakes in my heart hospitality's glow.

The Pine tells of constancy. In its sweet voice,
It whispers of hope till sad mortals rejoice.

The nut-bearing trees teach that 'neath manners gruff
May be found as "sweet kernels" as in their caskets rough.

The Birch, in its wrappings of silvery gray,
Shows that beauty needs not to make gorgeous display.

The Ash, having fibres tenacious and strong,
Teaches me firm resistance, to battle with wrong.

The Aspen tells me with its quivering leaves,
To be gentle to every sad creature that grieves.

The Elm teaches me to be pliant yet true;
Though bowed by rude winds, it still rises anew.

The Lombardy Poplars point upward in praise,
My voice to kind Heaven they teach me to raise.

I am taught generosity, boundless and free,
By showers of fruit from the dear Apple tree.

The Cherry tree blushing with fruit crimson red,
Tells of God's free abundance that all may be fed.

In the beautiful Linden, so fair to the sight,
This truth I discern: It is inwardly white.

The firm-rooted Cedars, like sentries of old,
Show that virtues deep-rooted may also be gold.

—Helen O. Hoyt.

Address—Dedication of the Tree or Trees

TREE PLANTING SONG

Tune: America

Joy for the sturdy trees,
Fanned by each fragrant breeze,
Lovely they stand!
The song birds o'er them trill,
They shade each tinkling rill,
They crown each swelling hill,
Lowly or grand.

Plant them by stream and way,
Plant where the children play
And toilers rest;
In every verdant vale,
On every sunny swale—
Whether to grow or fail,
God knows best.

Select the strong, the fair,
Plant them with earnest care,
No toil is vain.
Plant in a fitter place,
Where, like a lovely face,
Let in some sweeter grace,
Change may prove gain.

God will His blessing send,
All things on Him depend,
His loving care
Clings to each leaf and flower
Like ivy to its tower.
His presence and His power
Are everywhere.

—S. F. Smith.

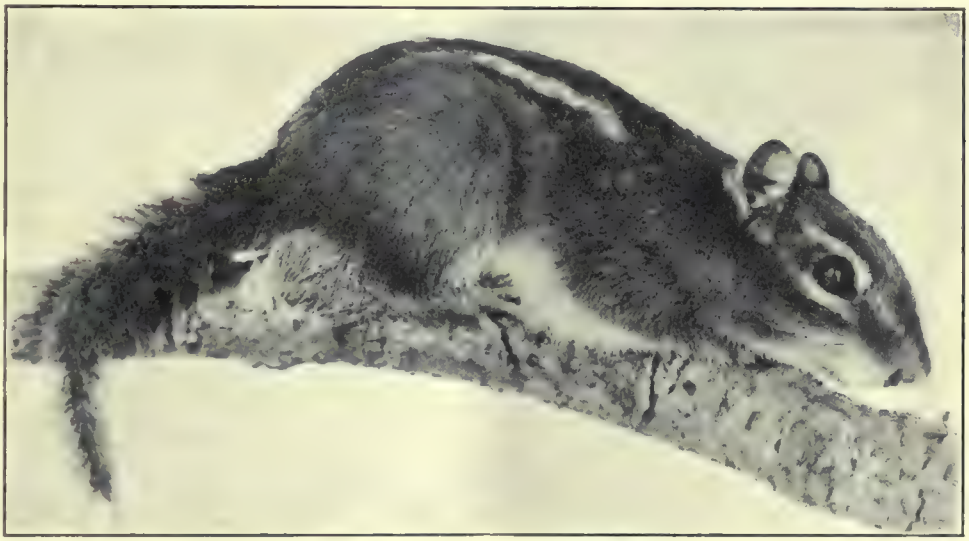
Every tree lover should be a member of the American Forestry Association. Write to the office, Maryland Building, Washington, D. C., for particulars.

FOUR-FOOTED FORESTERS—THE SQUIRRELS

BY DR. R. W. SHUFELDT, C. M. Z. S.

THERE is no region, country, or continent on the globe that can in any way rival North America for the great number of squirrels, both species and subspecies, represented in her fauna. In so far as brilliancy of color and size are concerned, however, the handsomest and largest squirrels in the world are found in various countries of the Orient and the East Indies. For instance, along the coast of Malabar is found a squirrel as big as an ordinary cat; this animal is bright red on the upper part of its body, offset by the most intense black, while all the lower parts are of a clear yellow.

The largest squirrels found in the United States are the fox squirrels, and some of these are also called cat squirrels; not that any of them look like a fox or a cat—the terms probably have reference to the color of some of the species in the first instance, and in the second to the matter of size. The largest arboreal squirrel in the United States is the fox squirrel of the northeastern section of the country, an animal now becoming extremely rare in the districts where it used to be very abundant. Like all fox squirrels, it is subject to great variation in color; and some people might think they had several species before them were they to see a lot of them together, selected with the view of exemplifying these color phases. Unlike the gray, the fox squirrel hoards up little or no food for the winter months, and this seems to be a season he does not especially relish. In fact, in very cold weather with deep snow, he will roll himself up in some warm hollow of a tree and there partly hibernate. Should a warm spell come along, many of the fox squirrels will shake off their stupor, descend to the ground, there to stretch about under the hardwood trees where the snow has disappeared to a greater or less extent, to find hickory nuts, chestnuts, beech mast, and so on; if it chances that spring is drawing near, they may find some swelling buds to fill out the list.



COMMON EASTERN CHIPMUNK

Fig. 1. A young male which was a pet of the author's for more than a year, but it never became very gentle. Usually the tail of this and allied species is much more bushy and handsome.

During the late spring and summer months, these big, lazy squirrels fare much better; there are plenty of berries and wild fruit, and there is nothing they enjoy more than the ears of luscious, sweet corn, ripening early in the fields of the farmer. In the estimation of the fox squirrels, this is far and away ahead of all the seeds of pine cones, or acorns and nuts they ever tasted. They think mushrooms not bad though, and will eat them when they find them.

It is rarely the case that any of the larger hawks or owls capture a squirrel of this species; they are usually pretty cautious, and, being big and strong, they can take very good care of themselves. For all that, it is likely that a Great Horned Owl or a Snowy Owl could manage one all right, especially the former, as the writer has often seen it hunting through the woods in the day time. And, as the fox squirrel is a late riser, and never makes a practice of being out of his hole at night, he is also, to some extent, free from the attacks of the racoon, wildcats, and gray foxes. Nevertheless, these animals are his enemies and destroyers; they undoubtedly capture and devour many a fox squirrel, especially throughout the South or such parts of it where cats, foxes, and 'coons are plenty. However, they have more to dread from the shot-gun and wicked modern rifle of the hunter, who comes to a tree where he notices the scattered scales of the cones underneath—a sure sign that a fox squirrel is up there, biting them off to get at the seeds. It *may* be some other species, but it is more likely a fox squirrel, and the hunter will surely scout around that tree till he gets him.

In the South, instead of living in the hollow trees, the fox squirrels build big nests in the tops of the pine and other trees—usually of Spanish moss; in these they sleep, also carrying to them the pine cones just mentioned. In the hardwood forests of the North, dry leaves take the place of the Spanish moss, and a conspicuous nest is built with an entrance hole at the side. Sometimes these leaves turn a brilliant yellow, and then they attract the attention of any one who is an observer of such things in the woods. Many people relish the fox squirrel as

food, while others do not fancy it in the least. A Florida cracker, however, will stand guard over a tree with his rifle or gun for half a day, if he thinks he is going to get a shot at a fox squirrel. As game, there are few things he likes better; and it is difficult for him to find language to express himself if, after a long wait, he shoots his squirrel, and the latter, merely wounded, comes bumping down through the tree, catching his hind or fore feet in a long festoon of Spanish moss, spins around like a top while it holds him as though he were tied by a strong piece of hemp twine. There he hangs—perhaps where it is impossible to reach him, or where a score of rifle balls will not cut him loose.

These squirrels, as well as other species, are, during the summer months, infested by a larva that gives them no end of trouble and discomfort.

When surprised in the woods, the behavior of the fox squirrel is quite different from that of the gray species. As a rule the former will put forth his best endeavor to reach some hollow in a tree, and into this he quickly scrambles to avoid his enemy. One may often see them stretched out on a limb as flat as possible, and they will, thinking themselves unperceived, remain a long time in that position as quiet as a mouse. If cornered by there being no hole handy for him to get into, and the limb he is on is too small to hide him, he will begin barking at the hunter or his dog in the most defiant manner possible. It is said that a fox squirrel can beat off a small dog, and will put up a hard fight if one attacks him. The female has her litter in the nest, wherever this may be, and the young are born in April in the North and month earlier in the South.



THE GRAY SQUIRREL

Fig. 2. All are more or less familiar with the species here shown; it is a fine specimen of the Gray Squirrel, in the attitude it assumes when feeding. (From life by Mr. George Kingsley, Maquoketa, Iowa.)

The habits of the several species and subspecies of fox squirrels of the North, West, and South are much the same, differing only as the animals are affected by their environment and the influence of climate. The southern species are more active than their sluggish relatives of the North, and this they show in their general build and appearance.

The fox squirrels are frequently kept as pets in large cages; they are usually gentle, but not as interesting as many other pets of the kind. Sometimes we see them in wire cages in zoological parks; but they are not often seen at liberty in the open parks of cities, places where the gray squirrel is now so abundant. (Figure 2.) In nearly all the large, wooded parks in and about New York City, and even well out into the suburban districts, the latter species is very abundant. In such localities they thrive marvelously well; and, as the law prevents their being in any way molested, they become particularly tame and sociable. It is no unusual thing to see, early in the morning, some old gentleman, or a lady with children, all being fond of squirrels, in some nook or pathway of a large city park, feeding the squirrels with nuts they have brought for them. Some of the little gray fellows, less timid than others, will scramble up on one's clothing and hunt in the pockets, or run out on one's hand and arm to secure the nuts they are so fond of, and of which they so often really stand in need, as the trees fail to provide sufficient for the consumption of the many that live in the place. Such localities afford abundant opportunities to study the habits of this species, as they behave practically as they do in their native wilds. Their nests of leaves are often seen in the trees, and every hollow limb or trunk is utilized by a pair for a home in which to rear their young and store away provisions for the winter. Stone and Cram have truly said in their "American Animals," that the gray squirrels "are comfort-loving animals, and away in the silent forest a gray squirrel must be forever on the alert to guard his hidden stores against the thieving red squirrels and the wild mice of the woods, and always listening for the rustle of a fox's footstep on the leaves, or the distant screaming of a hawk. For the red-shouldered hawks are dangerous enemies, and the hours they habitually choose to spend in hunting, correspond exactly with the squirrel's working hours—from sunrise to ten o'clock in the morning, and from three in the afternoon until near sunset. They watch, cat-like, for an opportunity to take some unhappy squirrel unawares, or, circling high above the tree-tops, their keen eyes penetrate the foliage from constantly varying positions, searching branch and hole and the carpet of fallen leaves beneath, till, perceiving the flicker of a curly tail, the long wings close of a sudden, fan-like, and the hunter goes down with a rush to match his quickness against that of the squirrel. Or the still more treacherous goshawk or Cooper's hawk, with their narrower wings and slender, yacht-like build, shoot along with baffling swiftness through the undergrowth, just to surprise the busy harvesters at their work.

"The gray squirrels also know that the men found in the woods in the fall, unlike the town variety, carry guns

and feed on squirrels to a certain extent. With very little encouragement they will soon learn to pay you frequent visits in your room, if you will only leave a window open for them within jumping distance of their treetop, a few nuts or a piece of cake quickly overcoming their shyness; in fact, they often prove to be something of a nuisance about the house. Even in places where they are looked upon as legitimate game, they lose much of their fear of man during the closed season of spring and summer."

There are many instances on record of a number of squirrels occupying the same hollow in a tree; in fact, when surprised in the woods, as many as five may be seen to scamper for the same hole in some big hickory or oak, every one of them getting into it in a hurry. Whether it is a pair and their nearly full-grown young ones it is often difficult to tell, as the latter, at that time of the year, are very similar in size and color to their parents.

So numerous were the gray squirrels in the years gone by, that in some States premiums had to be offered to assist in exterminating them, or at least greatly reducing their numbers. For instance, as long ago as 1749 they much annoyed the people of western Pennsylvania; the government offered three pence a head for them, and through this means no fewer than 640,000 were destroyed.



LIKE A SQUIRREL'S TEETH

Fig. 3. Skull of a Coypu that died in the National "Zoo" at Washington, several years ago. Note its enormous incisor teeth. These last, described in the text, are an exaggeration of what we find in all squirrels.

Of late years there seems to be no record of a migration of gray squirrels; but fifty or sixty years ago—and doubtless later—such things were not uncommon. They usually occurred in the West, and were truly remarkable phenomena to behold. Thousands upon thousands of these animals would congregate—a great, rolling, gray sea of animal life—supplied by all the forest regions for miles around. In spite of their strong love for the forests where they were born and grew up, and their dread of water, they would commence moving off to some other region. Away they went, over farms and prairies and through the forests, consuming everything in their way that could possibly be eaten, until some river or stream interrupted their onward course. It mattered little then how wide or how deep this river was—cross it they must in their intense impulse to migrate. The Ohio has been the scene of many such crossings. Upon arriving at its bank, those leading the mass would run up and down and swarm into neighboring trees; but finally, in spite of being, perhaps, among the most indifferent swimmers in the animal world, pressed from behind by the legion of their advancing companions they take to water. They rather wriggle than swim, with only their noses out of water. Hundreds of their number drown, and their lifeless bodies, massed together, float down the stream. The sight is most extraordinary, and can only be compared with the migration of the lemmings, so familiar to those who know anything of the life-history of those animals.

As the gray squirrels reach the other side of the river—or rather such of them as do—they are almost completely exhausted, and hardly able to drag themselves upon the bank. They are fortunate, indeed, if dozens of men and boys have not gotten wind of their coming, and on hand to meet them with clubs and sticks, to dispatch them as fast as they land.

It is difficult to ascertain the cause or causes responsible for bringing about one of these migrations. Possibly it is an impulse to seek new regions where food is more plentiful, it having become nearly exhausted in the country they leave by common consent. The explanation may lie deeper than this, and such migrations date back to a time in geologic history, when other and entirely different causes brought them about, the descendants doing nothing more than their early ancestors were compelled to do, the common instinct still being persistent.

In various parts of the country a coal black squirrel is met with; it is but a melanistic variety of the gray, and it is now becoming quite rare. They are about the same size as the gray squirrel and have similar habits; indeed, in old times and perhaps still in some regions, the "blacks" and the "grays" are found inhabiting the same stretches of timber, and even living in the same trees.



A CHIPMUNK

Fig. 4. There are a great number of species and subspecies of Chipmunks in the United States, and here we have one of the southwestern forms. Their habits and food vary according to their several habitats.

When alarmed by the approach of a hunter, or a dog, or a hawk sailing overhead, the gray squirrel has a habit of giving vent to a peculiar little bark or whine which may be heard for a considerable distance. Apparently he does this in order to put such of his kind as are within hearing on their guard against the danger that threatens them. When wounded, especially if they stick in the tree where shot, they will utter a shrill little squeal, not altogether unlike a big rat caught in a steel trap.

Squirrels are the prettiest and most interesting animals found in the whole realm of nature. The person who fails to admire them anywhere, and especially in their native woods, and who does not love them with all their pretty ways, graceful forms, and cunning tricks, must surely have something radically wrong with him somewhere.

Mr. C. L. Holmes, of Waterbury, Connecticut, has called attention to the following facts in regard to the hybridization of the red and gray squirrels: "In 1874 or '75, like most boys of twelve or thirteen, I was very fond of pets, and spent quite a little of my time trapping squirrels, both red and gray, which were very abundant around my father's house. One day I found, in an old-fashioned spring-door wire rat-trap, a squirrel which my father and we boys declared must be a cross between the red and the gray. It was about half way between the two in size, and had a red tail and a gray body; white underneath, and a red stripe between the back and the belly. Its head was shaped like a red squirrel's, and had a little red on it. It was the most active animal for its size I ever saw, and it was with considerable difficulty that I finally got it from the trap into a wire bar cage, which I had used for several years to hold both red and gray squirrels. I put the cage in the conservatory, and we were standing around admiring him, when he gnawed off some solder, pushed the wire down, and was out of the open window like a flash. It was a great disappointment for a boy I assure you. I believe then, and always shall believe that I had secured a rare prize."

If this were in fact a hybrid squirrel, produced by a crossing between a red and a gray one, it would indeed be quite remarkable, as the two species are, as a rule, by no means friendly, and never seem to get along well together. One may see more than a dozen white or albino gray squirrels in a lifetime, and several albino red ones; but there is nothing remarkable in that, any more than cases of albinism in other animals, as elephants, mice, woodchucks, robins, woodcocks, and scores of other forms—men and women included.

In these days it seems that nearly as many people

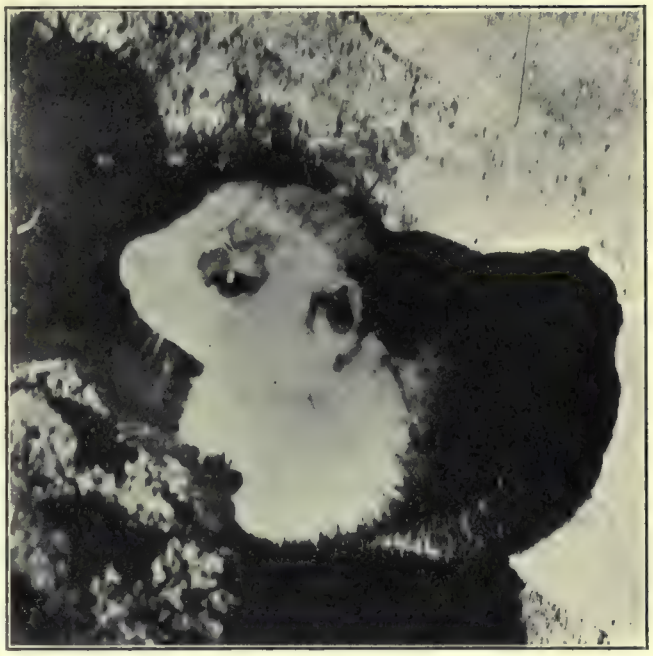


BLACK SQUIRREL

Fig. 5. One of the most elegant squirrels we have is the big Black Squirrel of Florida; its face and ears are gray, as is a part of the body and tail. It is a close relative of our gray squirrel, but much larger and not so gentle.

go into the woods to hunt squirrels with a camera as with a rifle or shotgun; and in many ways this practice is significant. Humanity is to be congratulated if we are coming to think less of giving pain, destroying life, and rendering creatures miserable—committing animal murder in fact—than of giving pleasure, recognizing the rights of others to live, and furthering the ends of happiness.

Sometimes, when in the tops of the high trees, springing from bough to bough, even the most agile of squirrels, either red or gray ones, will occasionally miss their footing, and fall down through the tree until they come in contact with some of the limbs or twigs below. To one of these they dextrously cling, instantly continuing their reckless course along the branches of the trees, leaping from the ends of one onto the terminal sprays of another, with a daring that but few of the arboreal animals can equal. Once, in a piece of hickory timber, with a few scattered chestnut trees growing on a hillside not far from the Zoological Park at Washington, D. C., when the buds were just beginning to swell, and the trees were tall and scraggly, with scraps of upcurled bark on the trunks and branches of the hickory trees, a fine, old red squirrel was seen scampering over the ground and ascending the first tree he came to. There being two persons present to observe his subsequent behavior, he evidently became somewhat suspicious, running out on the end of one of the highest branches, and making a leap into the next tree. Being up so high, he was not very much frightened, and so he passed from treetop to treetop with all the fearlessness of an old hand at it. His observers were watching him closely; and when in the top of a very tall shellbark hickory, some



PRAIRIE MARMOTS

Fig. 7. Among the more or less nearly related forms of our squirrels are the Prairie Marmots of the western plains, erroneously called "Prairie Dogs,"—so named from the "bark" they have, which latter has a sound not unlike the bark of some of our larger species of squirrels.

fifty feet from where they stood, a tree at least 140 feet or more high, he ran out, as usual, along one of the uppermost limbs, and in doing so ran over a piece of lightly attached shellbark, about the size of one's hand. His weight was sufficient to have it instantly part company with the tree; and before he could regain his balance, or catch onto anything else, both fell together, it being a sheer drop of something less than 150 feet. Down he came, belly downward, with out-stretched tail, convulsively clutching the air with all four of his little paws, without touching another single twig in his fall. He struck the hard ground with a thud that could be heard for a considerable distance, and bounced up over a foot in the air. One would expect, of course, and with very good reason, that he would be completely knocked out by the shock; but no! The little chap gave one big gasp for breath, gathered himself together, and in less than five seconds he was off again and up another tree in less time than it takes to tell it. This was the tree he was making for when he fell, and when he reached the middle of it, in he popped into a hole, and that was the last seen of him. Had a man been a victim of a similar fall, he would have been killed for a



BLACK SQUIRREL EATING

Fig. 6. Here we have the same animal shown in Fig. 5. above; it is eating a part of a nut, and the curious angulated pose it assumes when so engaged is remarkably well exhibited in this cut.

certainty, and the chances are that half the bones in his body would have been broken in the bargain.

Some time ago a rather remarkable discussion was being carried on in some of the popular scientific periodicals of the country as to when the squirrels drink, or whether these little animals ever drink any water. In these days this appears to be a most extraordinary inquiry to make—one might as well start a similar interrogation in regard to any other abundant and well known animal, domestic cats, for example. Squirrels drink whenever they are thirsty, and when they meet with water sufficiently pure, they quench their thirst. They will lap it off the leaves after a rain, or take it where it gathers in the hollows of the trees, or in depressions found on the tops of rocks with broken surfaces, from pools or the brinks of streams, or indeed anywhere it is convenient. Those species kept as pets drink water regularly and suffer when they do not get it. They drink very rapidly, plunging their muzzles well into the fluid. Sometimes it may be noticed that after drinking, the red squirrel is attacked by a peculiar fit of something akin to coughing, accompanied by a kind of wheezing and sneezing, as though some of the water had been snuffed up into the nostrils, or gotten into the air passages.



RED SQUIRREL

Fig. 8. This little Red Squirrel or "Chickaree" was captured in Virginia many years ago; it is an excellent portrait of the eastern form of the species, and it is here given in another pose in Fig. 9.

An exceptionally fine species of American squirrel is the black one of Florida, which is a splendid animal and carries a fine, bushy tail. His coat is nearly black, set off by the light gray muzzle and ears. He is a nobly put-up form, full of vigor and vivacity, and extremely graceful in all his actions and motions. When reared from the young, he makes quite as interesting a pet as the gray squirrel does, and exhibits just as much affection for his owner.

Abert's squirrel is a species fairly abundant in the high pines which occur upon the mountain sides, principally to the northward and eastward of Fort Wingate, New Mexico, and they have frequently been taken within a mile of the station. A good hunter once stated that he had shot nine of them, all within five miles of this locality, and only hunted a few hours each day. There is also a splendid black phase of this species of squirrel; and very dark gray ones also occur, which are really handsome animals, as the white part in them are generally purer, and the specimens improve by the contrast in the colors.

Mr. H. W. Henshaw, who many years ago was connected with Hayden's Survey, and who has collected the California gray squirrel, once pointed out that that species is even a handsomer animal than Abert's; but it is hard to believe that anything in the shape of a squirrel could surpass an Abert's in its spirited aspect, its grace and beauty; then, too, it is one of our largest varieties, which also adds to its otherwise fine appearance. This animal is essentially a tree lover, and rarely spends any length of time upon the ground. If suddenly surprised in the forest, it immediately seeks the nearest and largest pine tree within its reach by a series of very active jumps and skips; ascends with great rapidity to the first branches, where it often stops to take a look at the intruder, thereby affording the gunner a capital opportunity to bag the specimen.

The Arizona squirrel is a somewhat larger species, and quite different in habits. Unlike Abert's, it is rather partial to the crests and sidewalls of the canyons of the country where found, and is very much of a ground squirrel, rarely resorting to the trees when surprised by the hunter. As a matter of fact, they are but rarely observed in a tree. This squirrel always rears its young in a hole dug in the side of a clay bank or similar locality. All the squirrels are more or less carnivorous in their habits, and will eat raw meat with avidity. It is stated on good authority that the red squirrels will pillage birds' nests and devour either the eggs or the callow young.

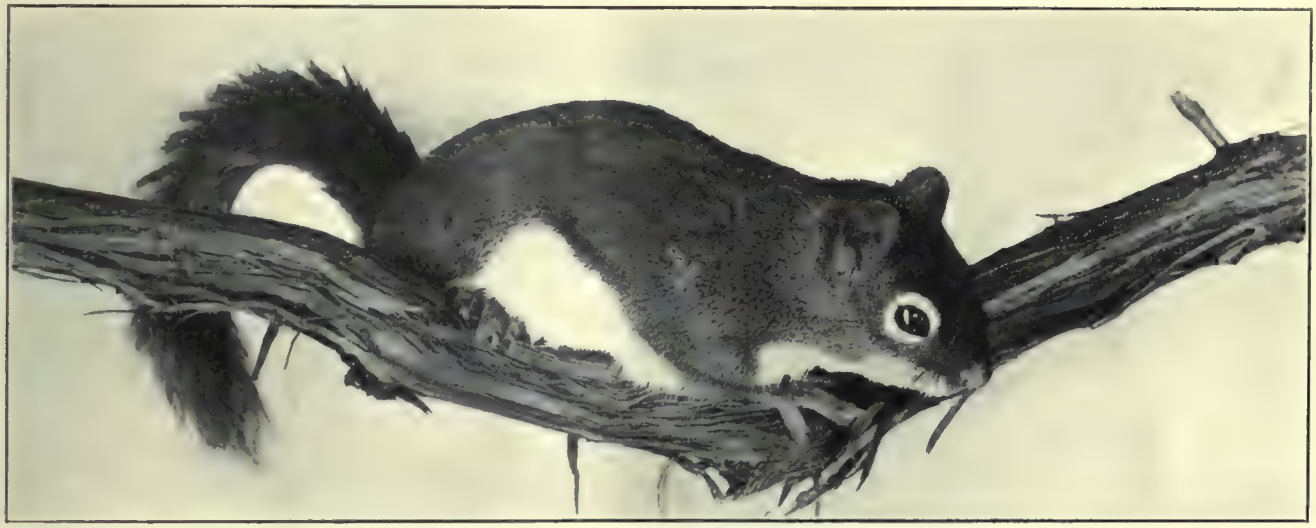
Counting the true squirrels, the flying squirrels, and the chipmunks or ground squirrels, we probably have upwards of sixty different kinds of these little animals in America; to appreciate what a formidable list they make, one should consult such a publication as the "List of North American Land Mammals in the United States National Museum, 1919," compiled by Dr. Gerrit S. Miller, Jr., curator of the Division of Mammals in that institution. Probably other species have been added to the catalogue

since it appeared. As it stands, we find in it over 40 different kinds of chipmunks enumerated as occurring within the boundary lines of the United States. This includes species and subspecies, and does not take into consideration those which are extralimital or confined to Mexico or Canada, as the case may be.

A good deal has been written about chipmunks, and they are fully worthy of all the biographies that have appeared about them (Fig. 1). In various works they are not only known by this name but referred to as hackees, or ground-hackees, striped squirrels, striped ground squirrels, and ground squirrels. All are small mammals of marked intelligence, and if properly reared and treated make very affectionate pets. In them the cheek pouches are highly developed, each consisting of a hairlined pouch, occupying quite a space on either side of the mouth, with the opening to the front. One of these pouches will hold several large nuts, and it is a remarkable sight to see one of these little fellows making off to its burrow on a run with a big butternut in each cheek. It suggests a little animal with a head three times too big for its body. Some rodents have these pouches more to the outside, where their openings may be clearly discerned, as is the case with the gopher rats.

Another interesting structure in the squirrel family is that of the *incisor teeth.* There are two of these in either jaw—a pair above and a pair below. They may best be studied in the skull of any large rodent, as a beaver, a jack-rabbit, or a muskrat. The skull selected here is that of a South American Coypu. This animal died in the National Zoological Park a few years ago, and the skull was presented to the writer. (Figure 3.) Note the two large upper and lower incisors; these, by grinding upon each other, keep the four cutting edges as sharp as razors. In the case of nut-eating mammals like our squirrels, this is extremely essential. These incisor teeth keep continually growing, as they are worn off during the life of the individual—the upper pair downwards and the lower pair upwards. Curiously enough, they sometimes cause the death of their owner; for, should any blow, given in the mouth, turn either of the upper pair to one side or the other, so that the edges are not continually worn off evenly and regularly by the lower incisors, the misplaced tooth or teeth—the upper ones—will continue to grow in a curve, backwards, until their sharp edges come in contact with the roof of the mouth. In that part of the squirrel's skull the bone is quite thin and not strong enough to stop the advance of the tooth. The result is that it not only, in due course, pierces the palate, but grows backwards into the brain, eventually causing the death of their hapless owner. A similar misfortune has been noted in the case of rabbits.

Chipmunks have another use for their cheek pouches. When they construct their most ingenious burrows, they use them to carry away the loose dirt resulting from their digging, to hide it so it will never be suspected where it came from. They are also careful not to wear a path leading to the entrance of their burrows, for it would be a guide to their retreat for some of their numerous enemies.



ATTENTION !

Fig. 9. This is the Red Squirrell in the attitude of attention; and squirrels, as a rule, have many different poses, each being characteristic of them and very distinct, as the feeding pose, when "barking," when burying a nut, sunning itself, and others.

In places where chipmunks are abundant, they are found to be extremely sociable little animals among themselves, playing together, until the approach of the coldest weather of the year, when they hibernate as do so many other small mammals occurring in the higher latitudes of our country.

One of our earliest writers on the chipmunk has said that "In the autumn this creature may be seen around the fields of Indian corn, and in the walnut and chestnut woods, filling his ample cheek pouches, and carrying off his store to his granaries. His hole is generally placed near the roots of trees, or in a decayed stump, or among a heap of rocks, or in a bank of earth, and usually near the forests or fields from which he draws his supplies. Sometimes his retreat has two or three openings; it usually descends almost perpendicularly at first; then it rises with one or two windings, and at last, at the distance of eight or ten feet, terminates in a chamber lined with

leaves, amid which the animal sleeps. Three or four occupy the place together. There are several side-galleries, where the stores of wheat, buckwheat, hazel-nuts, acorns, Indian corn, grass-seeds, walnuts or chestnuts, according to the productions of the locality, are deposited. They are excedingly provident, continuing to add to their supplies till forced into their houses by the inclemency of the weather. Often their stores are much beyond the necessities of the winter. The squirrels hibernate in their retreats and become somewhat sluggish, but do not approach the unconscious torpidity of the marmot. The young, four or five at a birth, are produced in the spring, and beautiful little creatures they are when first led forth by their mother.

"The chipping-squirrel rarely climbs trees, unless to escape pursuit, or perhaps occasionally to get at some desired fruit. It has a chip, often changed into a gurgling sound, when it escapes into a hole or conceals itself amid the recesses of a stone wall—seeming, in fact, to be a sort of scoffing laugh at the impertinence of the assailant. On other occasions its chip becomes a sort of song, in which several squirrels in different parts of the forest seem to answer one another, and thus to fill the woods with a kind of merry chorus. Though not familiar, and seldom or never becoming reconciled to confinement, preserving always a rather sullen appearance, still this little creature is a general favorite. His voice is associated with the woods and bright spring and autumn mornings, and especially with those happy days of youth, when every wood-ramble was an adventure, and even a chip-squirrel was game."



FLYING SQUIRREL

Fig. 10. The little Flying Squirrel makes an interesting pet, although he is not very active until after nightfall, or when handled by some one.

In the wilder and unsettled parts of the country where chipmunks abound in the forests, they have their enemies by the score, and these quite apart from man; for they are constantly preyed upon by hawks, minks, weasels, lynxes and wildcats, and occasionally by foxes. As to weasels, they have been known to chase a chipmunk into its burrow, when the latter has been made of good size, capturing and killing its owner in his very bed-chamber.

In some sections of the country our flying squirrels are very abundant; but as a rule their presence is only known to those who are familiar with their habits. (Figure 10.) This for the reason that they are nocturnal by habit, and but rarely seen during the daytime. Indeed, the sun seems to affect their eyes and cause them no small amount of inconvenience. They nest in the hollows of big trees, where their young, from one to half a dozen, are brought forth. They may be easily raised; and, be it known, they are far more agreeable pets than the chipmunks. Where these animals are very numerous in the forests, the only time they may be advantageously studied is some time after dark, on a moonlit night. To watch them in their gambols is the sight of a lifetime. One should select some spot of vantage in the woods where the trees are large and situated well apart, and the undergrowth practically absent. Watch that old male who is making his way to the top of a tall tree as fast as he can go. Once in the uppermost twigs, he selects a place where he can quit a branch conveniently, when he spreads out his legs lateralwise, which extends the skin-flaps on either side. He at once launches into the air, in the direction of another tree, which may be at a distance of fifty yards or more away. But our little animated parachute has calculated all this, and at first he scales downwards for two-thirds the distance, then more rapidly and abruptly upwards, landing safe and flat against the trunk of the tree he made for, and at once makes for the top of it as though his life depended upon his getting there. He then goes through a similar performance back to the trunk of the tree from whence he started. This he will do over and over again, and dozens of others of his kind will be performing in a similar manner in the near neighborhood. The observer can easily imagine that the air is alive with small shingles, sailing in curves from tree to tree, in all directions. Surely a very remarkable sight.

Squirrels have more or less near kin among other rodents, especially those that dig and live in burrows underground. Among these last we have the so-called "prairie-dogs," which are really marmots. (Figure 7.) These make capital little pets, as the writer can vouch for, having kept them on several occasions. The story that they live in their burrows happily associated with burrowing owls and rattlesnakes is a tale long ago exploded. These little animals are, to a very considerable degree, omnivorous by habit; for they will, when moderately hungry, devour with apparent relish such things as pie-crust, raw oysters, and fish.

BIRDS AND TREES IN WINTER

BY A. A. ALLEN, PH. D., CORNELL UNIVERSITY

GRAY skies, white hills, and cold winds are not conducive to thoughts of bird life. We look for beauty now in ice crystals on the windows, purple shadows on the snow, and dark branches silhouetted against the sky. Life is dormant and the little creatures that still eke out their existence with us seem not a part of the winter. While we marvel at the rich greenery of the pine, and the lacy network of the elm twigs, and the sturdy growth of the orchard trees, we forget that even during their winter sleep, their insidious foes are either



A DOWNY WOODPECKER AT WORK

Nature provides the woodpeckers to combat the borers. It is our duty to see that the woodpeckers are encouraged to remain with us in good numbers. Note the hole made by this fellow when he got the borer.

at work beneath their bark or are safely ensconced in its crevices awaiting the coming of spring to continue their deadly work of destroying the foliage. The boring larvae of the pine weevil and leopard moth are secure from all man-made destructive agencies deep down in the tissues; the tiny eggs from which thousands of tent caterpillars and canker worms will hatch are safe behind a thick coating of varnish, and the larvae of the codling moth have hidden themselves behind the loose flakes of bark of the apple trees. It is little wonder that they pass unnoticed and unthought of. Summer comes and the tops of the young pines shrivel and grow brown, the elm branches drop their leaves and die, the foliage of our shade trees becomes ragged and hundreds of little caterpillars hang down on silken threads or spin tents among the branches, and long before harvest, the apples fall to the ground and are wasted. Now, we say, is the time we need the birds.

But let us examine some of the young pines whose tops are still green. There beneath the terminal whorl of branches are two or three little round holes. Perhaps they are now filled with gum, for they were made last winter. They were made by a downy woodpecker to get the weevil larvae beneath the bark. If we examine the elms we find that it is the city trees that have suffered most from the leopard moth, trees that have not been visited by the woodpeckers. It is the same with the other shade trees but wherever a troop of nuthatches and chickadees and brown creepers have spent the winter climbing about the trunk of the trees, examining all of the crevices in the bark, and scrutinizing all of the branches, the leaves still retain their freshness and caterpillars are few. The little packets of eggs that would have given rise to thousands of caterpillars formed lunches for these winter birds. In the orchard irrregular holes through the loose flakes of bark attest their usefulness again for they tell of their inroads upon the hibernating codling moths. Summer is not the only time for birds. If we had more of them during the winter we would not need so many



THE DOWNIES LARGER COUSIN

This is the hairy woodpecker, and every dollar spent for suet or sunflower seed to attract the winter birds is a dollar well invested.

in the summer. Every effort, therefore, should be made to increase the number of winter birds.

Former numbers of AMERICAN FORESTRY have given directions for attracting the winter birds by maintaining feeding stations for them throughout the fall and winter. One should feel that every dollar spent for suet or sunflower seed is a dollar well invested, for thus a whole company of beneficial birds can be kept in our service. Far better than any spray for combating the codling moth we are told in the best manuals on fruit growing, is the fastening of suet in the trees to attract the winter birds. The same is true for many other pests



CHICKADEES CLEAN THE BRANCHES OF INSECT EGGS

These little fellows are a valuable addition to every woodlot.

of orchards and shade trees, and in forests we must, of course, depend entirely upon the birds and the other natural enemies of insects, for spraying is impossible.

Let us consider for a moment why birds are much more effective in controlling certain pests than any other means. Take the codling moth as an example, the worst pest of the orchard and one that destroys over a million dollars worth of apples every year. The little brownish moth lays its eggs on the newly formed apples shortly after the petals fall. The egg hatches and the larvae immediately begins to dig down into the fruit. If the spray has been put on at just the right time and has been put on evenly and has not been washed off, so that the larvae gets it in biting through the skin at its first meal, the larvae is killed and the apple is saved. If, on the other hand, the poison does not happen to be on the right spot at the right time, the larvae continues its way to the center of the apple and is safe from all enemies. The apple falls to the ground, the larvae matures and leaves the apple and crawls up the trunk of the tree. It then hides under a loose flake of bark where it spins a cocoon about itself and prepares to spend the winter. The next spring it transforms into the little moth that goes about laying its numerous eggs on the newly forming fruit. During its entire life cycle, therefore, there are but a few hours when the poison spray is effective against it and, inasmuch as all of the eggs do not hatch at exactly the same time, it is obvious that the chances of killing all of the larvae are very slight. With birds as the destroying agents, however, there are two periods when the codling moth can be controlled and each one



WOODPECKERS DESTROY BARK BEETLES

A useful downy woodpecker at work.

is of considerable duration. First, when the moths transform in the spring and the warblers and vireos and other migrating birds are passing through the orchards, and second, during the entire winter when the nuthatches, and woodpeckers, and creepers are scrutinizing the trunks of the trees for any possible insects that may be in hiding. It is little wonder, therefore, that the birds form a better method of control.

Another familiar pest is the tent caterpillar which is very destructive to all fruit trees. The reddish brown moth lays its eggs in the form of incomplete belts on the smaller branches, each belt or packet consisting of hundreds of tiny eggs glued together and covered with a varnish-like substance. These eggs hatch early in the spring when the leaves are just beginning to unfurl and the young caterpillars make their way to the nearest fork where they spin a little tent of silk to protect them. They work out from this tent, feeding on the leaves and adding to the tent as they need more room. If there are many colonies working on a tree they soon strip it of all its



A WINTER CREEPER

The Brown creeper searches the bark of trees for insect eggs and hibernating insects.

leaves. When the caterpillars are full grown they crawl to some convenient shelter and spin cocoons about themselves and later transform into the brownish moths. The moths then begin a new cycle, laying the packets of eggs, in which stage the insect passes the winter.

The tent caterpillar is much more easily controlled than the codling moth in the orchard but nevertheless from time to time is exceedingly destructive. In many communities men have been hired to pick the egg masses and later the cocoons from the trees and to burn the tents. Competitions among school children have been inaugurated resulting in the gathering of thousands of the egg masses, but all of these efforts have been spasmodic and have died out as spontaneously as they have arisen. The eyes of children working at odd moments in the spirit



WINTER BIRDS CONTROL THE CODLING MOTH

Here are some species of bark with holes punched through them by a woodpecker to get the hibernating larvae concealed beneath. The empty cocoons can be discerned in the top row showing the undersurface of the bark.

of competition over the branches which they can reach from the ground cannot compare with the keen eyes of the birds, working at all times over all parts of the trees and working for the very maintenance of life. The little caterpillars when first hatched furnish food for the warblers and vireos and wrens and other small birds on their northward migrations; the half grown caterpillars with their hairy covering are snatched from their tents by the orioles; and the full grown caterpillars cannot be too hairy or too juicy for the cuckoos that relish them more than any other insects. But it is not only by the summer birds that the tent caterpillars are destroyed. Hundreds of embryo caterpillars are destroyed at a single swallow by the nuthatches and chickadees hunting about the branches during winter and even the crows have been known to eat the little varnished packets of eggs.

These are but two of the hosts of insect pests that can be controlled by man but that are much more satis-



ANOTHER BARK CLEANER

The white-breasted nuthatch, with us throughout the year and a most useful bird. Here he is in a characteristic pose.

factorily controlled by birds when they are sufficiently abundant. There is an equally long list of pests that are either uncontrollable by man or that are controlled only by the greatest effort and expense, but that the birds are constantly though unwittingly fighting. There are, for example, the many kinds of destructive borers. It is often impossible to know whether borers are working in a tree until its vitality has been sapped if it is not killed outright. Nature knows this and she has provided the woodpeckers to combat them. She has given them pincer-like feet for clinging to the bark and stiffened tails to support them in their search about the trunk. She has given them chisel-like bills for hacking open the burrows and long barbed tongues for pulling out the larvae from their retreats. Nature has gone this far. It is our duty to see that the woodpeckers are encouraged to remain with us in good numbers. They must have an occasional dead tree in which to nest and to roost and they must have a little extra food during the winter in case their natural food is scarce. So when we are observing upon the winter landscape, marveling at the grace of the wind-swept branches and making our plans for bigger and better forests, and for more shade trees along our highways, let us not forget the winter birds. Let us include refuges, and feeding stations and sanctuaries for birds among the much needed civic improvements and let us call no forest preserve complete without its offering for the birds that are to help protect it.

EDITORS INDORSE CAMPAIGN OF FORESTRY

WITH the Anthony Bill, looking to cutting the size of newspapers up before Congress along with an investigation of the reasons for a news print shortage, more newspapers of the country are falling in line with the American Forestry Association in its campaign for a national forest policy. The editors all agree that the drive of the Association for memorial tree planting and for "Roads of Remembrance" will bring to the attention of thousands, who could be reached in no other way, the value of tree planting and what forests mean to the economic life of the country. We quote from the *Omaha Bee:*

"One of the plans *The Bee* has often urged on the people of Nebraska which will yet come to be adopted, looks to the afforestration of a great expanse of waste lands in the sandhill district. The idea back of this finds expression in the proposal of Charles Lathrop Pack, head of the American Forestry Association, that a national move in the direction be set on foot as an appropriate memorial to Theodore Roosevelt.

"No president felt the impulse more than he, nor did any understand so well the benefits to come from the proper administration of such a policy. Grover Cleveland gave life and vigor to a land policy that Roosevelt brought to its ultimate service, yet it was the strenuous one who could vision an America denuded of its wonderful timber growth. His conservation ideas did not get the encouragement they should; the public was not then responsive to the appeal, but some progress has been made. Under his successors more definite efforts have been put forth to save a portion of the natural wealth of the country for its people, but these have not as yet taken satisfactory form.

"The Pack suggestion does not lay so much stress on conservation as it does on reproduction. It will not prevent the reasonable use of forests standing, but looks to their systematic replacement by replanting. Valuable timber may be brought from seedlings within a generation; the marvelous firs and pines of the northwest, the giant oaks and hickories, the walnuts and the elms of the Mississippi Valley and the other wonders of the forests now gone, or fast going, can not be restored in less than centuries.

"But the Maryland and Virginia peninsulas show what may be done within a lifetime. What has happened there can be duplicated in Nebraska, in Wisconsin, Minnesota, and other places throughout the land. The future demand for timber may not be equal to that of today; it certainly will not be so satisfied, but the present generation can well endow the future inhabitants of the land by taking steps to give them something in the way of standing timber."

The *Philadelphia Inquirer,* the *Trenton Times* and the *Houston Post* are among the other papers that have commented editorially on the possibilities of making a national forest policy the great tribute to Theodore Roosevelt. In the *Biddeford, Maine, Journal,* we find the editor expressing this view:

"Recalling Theodore Roosevelt's love for nature, President Charles Lathrop Pack, of the American Forestry Association, urges the planting of trees in all parts of the country as memorials at this time of general commemoration of his birthday.

"In a broader aspect, this Association has begun a campaign for the planting of memorial trees and the creation of "Roads of Remembrance" as a simple and effective way of bringing the great principles of reforestation before the public mind and keeping it there. It is pointed out that to interest the people in trees is the first step in the process of establishing such automatic recognition of the value and need of a specific national forest policy as shall be effective to save wide areas of country from climatic calamity, create much wealth in timberland and avoid the fires which now all too frequently cause such heavy loss.

"It is believed that this idea of planting trees on a large scale as memorials of distinguished men is an excellent one, as it has an appeal which will be of general service to all the people while at the same time carrying a romantic tradition of enduring strength in the national character. It is argued that the forests are like a bank account, in that they cannot be continually drawn upon unless deposits are made occasionally. The need of a national forest policy admits of no argument on the negative side; it is not a project for the benefit solely of any particular individual or class, such as the lumberman, the paper-maker, the wood-worker, but for all the people.

"To say nothing of the rapidly growing demands for home consumption, the demands from all parts of the civilized world upon the United States for lumber and forest by-products in this ante-war period will be greater than ever before. Consequently, every practical consideration is on the side of a vigorous and intelligent conservation of our natural resources. Among those resources the forests are particularly important, not only from the material standpoint of dollars and cents, but from the no less practical standpoint of the protection and conservation of the physical and spiritual health of the general public. The planting of memorial trees affords the opportunity for creating headway for a campaign of interest in and practice of the science of reforestation. So far as it goes it is an admirable means to a desirable end. The planting of the suggested "Roads of Remembrance" may be the next step in the movement to the end that there may be created a public sentiment favorable to the reforestation of large areas that have been denuded by the forest butchers. The forest owners are slowly learning their lesson. When that has been learned they will realize that it is not good policy to harvest one crop and leave the area in such shape that another crop cannot be secured for fifty or seventy-five years, but that the better way is to cut only the more mature timber and leave the smaller growth for a later cutting. Thus successive crops, at least two or three in a generation, may be secured in such a manner that the tract will be left in as good condition as when operations were first begun."

The *Baltimore News* reviews the figures in the *Wall Street Journal* and calls them "a note of warning." Further on the *News* says:

"Our foreign lumber trade amounts to about 3,500,000,000 feet a year; and this year the demands of European reconstruction will call for an even greater amount.

YE SCRIBE PRACTISES WHAT HE PREACHES

(Burton (Wash.) News.

The American Forestry Association urges that we plant trees in memory of our boys who gave their lives for the world's freedom. Trees that will shade and adorn the highway are especially desired. Ye scribe hereby pledges one broad-leaved maple and one dogwood along the front fence, as soon as the rains start in earnest.

EDUCATION BY THE ASSOCIATION

'Whatever part of this the United States supplies,' says the *Wall Street Journal*, 'will be at the expense of the future;' and it goes on to point out that Britain is planning to plant nearly 2,000,000 acres of forest land, and that France, Norway and Sweden are preparing restrictions to prevent cutting in excess of the annual growth. It urges the public 'to insist upon appropriate legal measures to keep cutting within the limits of annual growth and to extend reproduction.'"

The *Rochester Democrat and Chronicle* calls attention to the figures set forth by the *Forest Patrolman*, which says that forest fires are costing the West five or six million dollars every year.

Following are other editorial opinions:

Colonel Roosevelt was a lover of all that pertained to the great out-of-doors. This being true there can be no more suitable tribute paid to the former President's memory than the planting of trees and the preservation of forests. Forests are among the greatest national resources. Forests are like banks, as Mr. Pack told the foresters, lumbermen and wood users generally at the Indianapolis meeting, you must deposit them if you want to take anything out. Then, in addition to the material benefits to be derived from the restoration and conservation of forests, the planting of memorial trees is one of the greatest forces for Americanization and keeping aflame the community spirit, born of the war.—*Trenton, New Jersey, Times.*

Illinois is a tree-growing state. As such it is interested in the work of the American Forestry Association and that interest should be encouraged. The association is carrying on a campaign designed to bring about a general forestry policy. In the meantime, each individual can do something to help out in the matter of replacing American timber. No bit of land should be permitted to go to waste, simply because it is not suitable for the raising of grain crops or for gardening purposes. It will grow trees.—*Springfield, Illinois, Journal.*

The *Sentinel* has called attention before to the imperative need of a broader and more definite forest policy in this country. We have contrasted conditions in America in that respect with those prevailing in foreign countries, the comparison being decidedly unfavorable to the United States.

A broader policy on the part of the nation and of individual states is needed not only because of the demands of the wood pulp industry, naturally of much interest to newspapers, but for other reasons as well. *The Manufacturers' Record*, in the current issue, gives some of these reasons as follows:

"Failure of this country to adopt a national forest policy in past years is responsible in large part for the unpleasant situation which the lumber industry finds itself in today, according to Charles L. Pack, president of the American Forestry Association, in keeping with other commodities lumber has advanced greatly in price due largely to increased demands for war needs."

The matter is one of immediate importance. It cannot be deferred indefinitely. Something should be done, and done now. —*Winston-Salem, North Carolina, Sentinel.*

Charles Lathrop Pack, president of the American Forestry Association and during the war the guiding spirit of the National War Garden Commission, is out in a new campaign before the American people. He has a gospel of four words and he is preaching it mightily and unceasingly: "Let there be trees."

Mr. Pack recognizes the manner in which trees enter into our every-day life. To him, as he would put it before the people, the tree is a friend, a companion, a defender and a comforter.

Mr. Pack has launched a drive for the planting of trees. He would have every person in the nation become responsible for the planting of at least one tree. His program includes planting memorial lanes in honor of dead soldiers, community parks with each tree named in respect of a departed or wounded hero; reforestation of cut-over areas; orchards on the roadsides, and so forth.

We might suggest a slight addition to this ambitious plan. Let every person in the nation become responsible for two trees, one of the long-lived hard-wood types, which will exist in some suitable locality for many a year after the planter is gone, and the other of the food type, such as apples, plums, peaches or other fruits in other sections of the country, or a nut-bearer, each of which will add to the food supplies of the world and help cut down living costs for the coming generation.

But even if the tree planted is of neither of these kinds, but purely ornamental, it will have its value and it ought to be planted.

Let there be trees.—*Pontiac, Michigan, Press.*

That is a praiseworthy project of the American Forestry Association which seeks to have memorial trees planted and "Roads of Remembrance" created as a means of reforestation. The association is spreading the idea throughout America and pointing out that when it interests the people of the country in trees it has brought to their attention something that is likely to advance far a national forest policy which will mean a great deal to the country in the years to come.

In a country in which already the scarcity of timber is keenly felt and where the woodlots on the farms have practically become a thing of the past as any considerable factor it is time that some such policy were adopted. If we promote an abundance of trees for no other reason than soil protection and to perform service in the matter of moisture storage we have done a very great deal.

Something must be done to replace these forests, if not in a mass tract along the highways. No more appealing suggestion has been made than that just advanced by the Forestry Association. In a comparatively short time the trees would reach maturity.

Wouldn't it be pleasurable today to ride for miles along a country road lined with trees and realize that those trees were set out in the late '60s as memorials to those men who fell in the Civil War?—*Watertown, New York, Times.*

The American Forestry Association has issued an appeal to every school in the country to plant a tree this fall. It will send free tree planting instruction, and suggest an interesting program for a tree-planting observance. Tree planted school house grounds will serve several ends. Children will take pride in their school when thus adorned, and different classes will emulate each other to see which can do the most in beautifying it. If every school house could be made a center of pretty landscape gardening, the idea would spread from the children to the homes. —*Staten Island Advance.*

The seriousness of the forestry situation in this country is being brought to the attention of the people by the American Forestry Association and there is hope that their work will have the effect of awakening a genuine interest in saving and recouping our timber interests.—*Florida Times-Union.*

The American Forestry Association has issued an appeal to every school in the country to plant a tree. It is a suggestion that might well be taken up in New Haven, where most school grounds are barren of grass or shade. Most recess playgrounds are paved with brick and no more desolate places are to be found anywhere.—*New Haven, Connecticut, Union.*

THE EXTENSION OF FORESTRY PRACTICE

BY HENRY S. GRAVES, UNITED STATES FORESTER

THE year covered by the report of the Forest Service for the last fiscal year was signalized by a new movement for extending the practice of forestry. More than 20 years ago the Division of Forestry offered to give advice and assistance to private timber owners who might wish to consider applying forest management. The offer received a remarkable response and formed a real turning point in the forestry movement. For the first time forestry in the United States became something which a business man could grasp and weigh on its merits as a definite business proposal. This aided powerfully in bringing the whole question of forestry, public as well as private, before the country. But it did not result in any widespread acceptance of the practice of forestry by timberland owners.

The failure of this early movement to get private forests extensively under management was, however, not immediate. The Division of Forestry made its offer of cooperation early in the fiscal year 1898. By the close of the fiscal year 1905 requests had been received for the examination of private holdings, large and small, comprising all told more than 10,900,000 acres of land. Many requests were from lumber companies and other owners of extensive timber tracts. On the strength of the showing made by the preliminary examinations, a number of these large owners entered into cooperative agreements for the preparation of working plans. The interest of the lumbermen was much increased by the fact that the young foresters were able to show them that they were losing money by certain wasteful practices. Closer utilization spread rapidly through the industry. Public interest in forestry and an intelligent idea of what it meant became general. In the early years of the present century it really looked as though the management of forests as permanent productive properties might be voluntarily undertaken by private owners on a very large scale. Although many obstacles were presented by the internal conditions of the lumber industry, progressive lumbermen were giving much serious attention to the possibility of engaging in the practice of forestry. The chief stimulus was furnished by the rising value of stumpage.

The panic of 1907 radically changed the situation. The lumber industry entered a period of protracted depression. From that time on private forestry made relatively little progress in the United States, except on farm woodlands. While public forestry has made vast strides, the forests of the country that are in private hands are being depleted with very great rapidity, and almost everywhere without effort to renew them. A grave situation is becoming manifest in various ways. This is why the Forest Service is now putting forth a new and energetic effort to call public attention to the facts and to propose a program that will afford relief.

The problem presented is one that can be solved only by public action. The general practice of forestry on privately owned lands in the United States will not take place through unstimulated private initiative.

The magnitude of the National Forest enterprise and the prominence given to its accomplishments have given the impression to some that the problem of forestry is under way of solution. In point of fact, this is by no means the case, for the National Forests represent in area only about a quarter of the forest area of the country and less than that proportion of the actual standing timber. Private owners therefore hold more than three-fourths of the present timber supplies of the United States. The amount of material which is actually placed on the market from the National Forests amounts to only about 3 per cent of the entire consumption of the country. The rest comes from private lands. While the proportion will be altered, the country must still look to private lands for a large part of its forest supplies.

The rate of depletion of our forest resources is more than twice, probably three times, what is actually being produced by growth in a form which will be servicable for products other than firewood. High prices of lumber are not wholly due to the increased cost of labor and materials. A part is due to the ever-retreating sources of timber supply. Already the supplies of all our eastern great centers of production are approaching exhaustion with the exception of the South, and even there most of the mills have not over 10 to 15 years' supply left of virgin timber. Already the southern pine is being withdrawn from many points as a competitive factor and its place taken by western timbers, with consequent freight charges which the consumer must pay. Communities needing to build roads and other public works which involve increased taxation are often having brought sharply to their attention the economic consequences of stripping off the forests and leaving in their stead unproductive wastes of low taxable value now or in the future. These facts are recalling public attention to the effects of uneconomic and wasteful exploitation of our forests in the past and to the need of steps which will put a stop to the destructive processes and replace them with methods which will build up rather than injure the country.

The situation necessitates a broad policy of forestry for the whole Nation which will include both an enlarged program of public acquisition of forests by the Government, the States, and municipalities and protection and perpetuation of forest growths on all privately owned lands which may not better be used for agriculture and settlement.

The proposed plan for realizing these objectives contemplates cooperation between the Federal Government and the States. The Government and the States must

join hands in working out a program that will bring into correlation the various public and private efforts for the protection and right handling of forests. The function of the Federal Government, in addition to handling the National Forests, would be to stimulate, guide, and coordinate State action and conduct necessary investigations regarding the best methods of forestry, to assist the states in classification of land, and to harmonize action as between the different States. The States would also have a function in handling public property owned by them, and they would have a further direct responsibility in connection with the protection and perpetuation of private forest lands.

In the matter of private forestry the Government would work primarily through State agencies. To initiate the proposed policy there should be a Federal law authorizing the Government to cooperate with the States in bringing about the protection and right handling of forest lands within their borders, and providing means for such cooperation.

The net result of the steps already taken to inaugurate and organize the new movement for forestry has been to attract renewed and widespread attention to the fact that a real forest problem must be reckoned with, and is of national concern; to establish a conviction in the minds of many who have first-hand knowledge of the facts that definite action to protect the public interests involved and safeguard a resource essential for economic and industrial stability is now required; and to secure what is believed to be a feasible program, of a character to command general acceptance as it becomes fully understood.

NEW YORK'S FORESTRY PROGRAM

A COMPREHENSIVE program of forestry development for New York State has been outlined by Conservation Commissioner George D. Pratt and presented to the Governor and members of the State Legislature for consideration.

Commisoner Pratt says:

"Investigations made during the war by this Commission, in co-operation with the United States Forest Service, for the purpose of locating available supplies of timber to meet the urgent demands of the Army, developed a situation so serious in New York State that it threatens the absolute existence of some of the most important industries within our borders—those that depend for their continuance upon unfailing supplies of forest products. The menace of a wood shortage, which these investigations disclosed, is imminent, and the need for immediate administrative steps to replenish our supply is great. The measures which I suggest for relief constitute a unified plan to meet the paramount necessity for a proper protection and development of the forest lands of the State, and have already in their fundamental features been thoroughly developed and tested by the work of the Conservation Commission in the two greatest forest regions of the State. They accordingly involve an extension to the State at large of the system of forest protection and development now practiced in the Adirondacks and Catskills, with trained foresters in each section, and a further intensification of forestry methods in every section, including the Adirondacks and Catskills.

"The shortage of nearly all kinds of wood material, with which we are faced, affects other states as well as New York, and has arrested the attention of foresters throughout the country, so much so, in fact, that Colonel Henry S. Graves, Chief of the United States Forest Service, has instituted a national movement for more rational use of this waning resource, and for effective steps to insure the growing of successive timber crops hereafter. In no state, however, is the situation more critical than in New York. This is due to the fact that New York is the greatest user of wood of any state, the total annual consumption amounting to over 1,750,000,000 board feet of lumber, in addition to 1,000,000 cords of pulp wood, over 130,000 cords for wood alcohol and other products of distillation, and enormous quantities of other material for railroad ties, cooperage, poles, and fuel wood. It has been estimated that the annual lumber bill of the state is over sixty million dollars, about two-thirds of which goes outside of the state. In spite of the fact that approximately two-thirds of the annual lumber needs are met by importation, it is nevertheless true that we are actually cutting within the state from three to five times more timber than is grown here each year. Statistics of forest products for 1918, which is the last year for which they have been compiled, show that in that year we cut 762,289,934 board feet, in addition to 18,651,346 miscellaneous pieces, like posts, poles, laths, shingles, etc.

"Our forests are thus rapidly vanishing, and it requires little more than arithmetical computation to determine the time when timber production in New York State will be a negligible industry, with the inevitable result that the vital manufacturing establishments which depend upon available supplies of wood will migrate to other fields. I submit that the remedy for this situation is one of the most fundamentally important problems with which we have to deal in New York State today.

"With a proper administration of the land best adapted for timber production, New York State should eventually be able to supply a large part, if not all, of its timber needs. The present forest area of the state is about 12,000,000 acres. This is approximately 40 per cent of the entire area of the state. In addition there is a large acreage which now lies abandoned, but which is well adapted to and can be used for forestry purposes. A future permanent supply of standing timber as a raw material for our industries is a problem of conservation of present resources and of right administration of this vast area. It is a problem of practical economic importance which we can under no circumstances afford to

overlook. We cannot stop the cutting of timber, because we need the material, but we must take steps to insure a better utilization of what we have, and a future replacement.

"For purposes of administration, I suggest the division of the state into ten forestry areas. Each of these areas should be placed under the supervison of an experienced forester, acting under the direction of the Division of Lands and Forests of the Conservation Commission in the same way that district forest rangers in the Forest Preserve counties now administer their forest areas. With this organization, the work to be accomplished would be as follows:

"1. *Forest Protection.*—This is fundamental in all forest work, and is absolutely indispensable if investments in forest property are to be safeguarded. Experience in the Adirondack and Catskill sections has demonstrated that this protection can be secured by the proper organization of a fire fighting machine. The forester in each of the districts of the state would effect such an organization.

"The protection of forested areas from the ravages of disease and insects should be an important function of the forester. For the last three years the Conservation Commission has been engaged in the detection and eradication of white pine blister rust in the state at large, as well as in the Forest Preserve counties, and has carried on a systematic study for the permanent control of this disease, in co-operation with the United States Department of Agriculture. As a result of eradication work and studies, it has been decided that white pine, which is the most valuable timber crop of the entire state, can be successfully grown in the future if proper administrative steps are taken to protect it from the blister rust. The division of the state into ten districts, with a forester in each, will provide the machinery for making this protection effective. The forester will also be able to give much advice and assistance to private land owners regarding the protection of their forest crops from other diseases and from insect attacks.

"2. *Forest Survey.*—The timber needs of the war strongly emphasized our great lack of information regarding forestry resources, and indicated clearly the need for a careful survey of such resources, as one of the first steps in a comprehensive plan for forest development. An inventory of forestry resources should be made in order that adequate information may be available for working out the details of a proper plan of management of forest lands. Besides the inventory of standing timber resources, a comprehensive soil survey of the state should be made, for the purpose of determining the lands fit for agriculture, and those that should be used for permanent forestry purposes.

"3. *Reforesting.*—There are two types of forest land in this state: One has some sort of forest cover, and the other has practically none. Reforesting of the non-forested area is vital to the welfare of the state. The forest is a crop. This is a truth which we have failed to realize while we have exploited with a lavish hand the free gift of nature accumulated through the vast unmeasured past. Already the Commission is operating six state nurseries, from which each year between eight and ten million trees are distributed for reforestation of denuded land. At the present time between four and five million of these trees are being planted upon state owned land of the Forest Preserve, while the remaining four or five million are distributed free of charge to state institutions and at cost of production to private land owners throughout the state. The plan for forest development accordingly contemplates a further development of this system, with enlargement of the state nurseries, and with increased attention on the part of the foresters to the planting of the trees. This work of wide-spread reforestation would be directed to several ends.

"The development of community forests in New York State is already under way, and much interest has been shown in the planting of forests on lands owned by municipalities, townships, counties, and school districts. For example, lands which the counties have acquired through the non-payment of taxes, lands which are owned or have been given to cities or villages, lands owned by municipalities, such as water works, and state land acquired through non-payment of taxes and foreclosure of loan commission mortgages, can very readily be made productive by forest planting. In many isolated cases, such lands have already been reforested with trees from the state nurseries, and it should now be one of the important activities of the district forester to make this wide-spread and effective on a broad state basis.

"Highway planting is important, and has for years been recommended by the State Department of Highways. Appropriate trees should be planted along state roads, not only for the purpose of increasing their scenic beauty, but also for conserving a proper amount of moisture by shading the roads, thus preventing the deterioration of the highways. The forester in each district could prepare the necessary plans, supervise the work of planting the trees, and see that after planting they are properly protected, this work, of course, being done in co-operation with the State Department of Highways.

"Increased interest is being taken in the care of existing shade trees, and in the increase of shade trees for the future. The district foresters could give a certain amount of advice to the communities in regard to this matter, and assist in the organization of shade tree associations, thus adding materially to the welfare of the state.

"4. *Scientific Cutting.*—The average owner of timber land, and particularly the owner of the farm woodlot, does not fully understand the proper method of cutting, thinning, or selection of trees to be taken or left upon the land, in order that the greatest net return may be had from the land throughout successive years and generations. It is accordingly of the utmost importance that there be established a proper silvicultural treatment of woodlands. The private owners should be shown how to differentiate between useful and weed species, thereby bringing their lands to a far higher state of productivity of useful kinds of wood. The farm woodlot can be

greatly improved by proper cutting, while at the same time a profit is realized.

"5. *Marketing.*—The marketing of various forest products is at present not working to the advantage of the people of the state. Logs are sawed at mills without a full conception of the needs of the market, and the products of valuable forest trees are thereby materially reduced in value. The collection of information throughout the state as to the demands of the market and the distribution of this information among the producers of timber would jointly benefit the producer of the timber, the manufacturer, and the ultimate consumer.

"6. *Forest Recreation.*—Within the last few years it has come to be realized more clearly than ever before that one of the most important uses of great forest areas is their recreational use. In fact, so important has this use become in the Forest Preserve counties that the business of caring for vacationists far exceeds even the lumber business itself, in the capital invested in it, in the wages paid, and in the annual turnover. Demands for maps and guide books have been insistent, and never before have the people manifested such a deep interest in the recreational facilities of the forests. Each year large numbers of permits are issued for camps upon state land, while the number who camp for short periods without permits is far greater. This interest in healthful out-of-door recreation has become a national characteristic, and is being met by the Federal government in all of the great national parks by the creation of a special department for attention to the needs of vacationists. The administration of the state-owned Forest Preserve for vacationists is now an important function of the Conservation Commission. In addition, the Commission has jurisdiction over the Cuba Reservation in Allegany County, which, by the leasing of its cottage sites, pays an annual net revenue. While the district foresters in the Forest Preserve counties would necessarily give more attention to the recreational development of their territories than the foresters in other counties where state land is not located, it is nevertheless true that the foresters in every district could do much to stimulate proper development of forest recreation throughout the state, and distribute information regarding the recreation advantages of the Forest Preserve.

"Free Trees for Reforestation.—In addition to the administrative measures outlined above, I believe that the state should supply trees for reforestation free of charge to private land owners, under agreements with the land owners that the trees will be properly planted and cared for.

"Constructive Forest Taxation.—I believe also that our forest taxation laws should be revised so that the private land owner may be encouraged to permit his forest crop to grow to maturity.

"A full summary of the benefits that will accrue to New York State upon the adoption of a broad plan for forest development will reach into practically every phase of the life of the people. Hardly an industry can be named, which is not in one way or another dependent upon supplies of wood. With the development of our water resources, the need for wood supplies will be even greater. A decrease in the production of wood products and a relocation of mills elsewhere will all tend to increase the cost of products to the consumer. We must accordingly maintain and develop our forests, and thus protect our industries, and employ our labor. We must insure permanency in industry, and not allow parts of the Empire State to become deserted villages. This is a social and economic problem, which a broad plan of forest development can do much to solve."

LANDOWNERS' ASSOCIATIONS FAVOR FORESTRY

THE following account has been only recently received by AMERICAN FORESTRY of an important meeting held in New Orleans on September 4:

Managers of landowners' associations in a number of Southern States held an important meeting in New Orleans, recently. Those in attendance were: George R. Wheeler, manager, South Carolina Landowners' Association, Charleston, South Carolina; W. A. McGirt, vice-president and general manager, North Carolina Landowners' Association, Wilmington, North Carolina; F. H. Abbott, secretary, Georgia Landowners' Association, Waycross, Georgia; Dr. W. F. Blackman, manager, Florida Cattle Tick Eradication Committee, Jacksonville, Florida; C. S. Ucker, executive vice-president, Southern Settlement and Development Organization, Baltimore, Md., and A. G. T. Moore, director, Cut-Over Land Utilization Department, Southern Pine Association, New Orleans. Mr. H. E. Blakeslee, chairman of the organization committee, Mississippi Landowners' Association, Gulfport, Mississippi, was also present, and his organization has since then, come formally into existence. All of these organizations are directing their efforts toward the development of the resources of the South, as a means toward the improvement of the value of the lands owned by their respective organizations. Their activities take the form of substantial backing of the movements for good roads, tick eradication, improvement of rural conditions, etc. Upon request of Mr. Ucker, State Forester R. D. Forbes, of the Louisiana Department of Conservation, laid before the meeting the forestry work which is being done by Louisiana. Mr. Ucker's attitude toward forestry and fire protection had been previously stated in correspondence with Mr. Forbes as follows:

"Personally, I have long since reached this conclusion, that the home of the long-leaf yellow pine and the slash pine, of the naval stores, turpentine and resin, that is the South Atlantic and Gulf Coastal Plain area from south side Virginia to the Gulf coast of Texas, would reforest itself in a very few years, naturally, if it were not for the continued fires, and on the contrary, if we can protect all of that area by co-ordinated Federal and State effort from fires for a period of five or ten years,

we will have an unbroken forest. Then I think land classification will largely take care of itself. As the population expands, as the new settler requires additional areas, he will segregate the best soil, clear it off, and put it to use, and in the meantime all the balance of it will be growing timber, which will be getting, as years pass by, more and more valuable."

Mr. Forbes was kept busy answering questions concerning the Louisiana situation and the feasibility of applying Louisiana's methods in others of the Southern States. The meeting finally unanimously passed the following motion:

"That the basis of successful reforestation is fire protection and that it shall be the purpose of the various organizations here represented to individually and collectively exert all possible efforts within their respective states and territories to the end that the custom of "burning-over" the land be stopped or minimized to the greatest possible extent and to further place practical reforestation prominently in their respective programs of future activities."

". . . That in our opinion the work of reforestation as conducted in Louisiana should be emulated in other Southern States and to the end that this shall be done will our efforts be directed."

"That it is the consensus of our opinion that cattle raising and reforestation should go hand in hand with any National forest policy which may be evolved."

The work being done by the Federal Government in co-operative fire protection under the Weeks Law was explained to the meeting and the effort to obtain an increase in the Weeks Law appropriation for fire protection from $100,000 annually to $500,000, received hearty endorsement.

FOR FOREST INVESTIGATIONS

OUR forest resources are being depleted from two to three times as fast as our forests are growing. The supply in our eastern section is rapidly approaching exhaustion; the forest supply in the South will be exhausted within twelve or fifteen years; much of the timber in the Lake States is gone, and that on the Pacific Coast is being steadily cut.

Measures for reproduction, for fire protection, and for other features of a national forest policy, to provide forests for the future, are absolutely essential at this time.

It is necessary, for the successful operation of a national forest policy, to have a series of forest investigations in order to develop the best method of reproducing, growing, and protecting timber on denuded lands, for cutting and protecting timber on timberlands, and for investigating other forest problems.

It is necessary, in order to conduct such forest investigations, to have forest experiment stations located in various sections of the country and also to provide existing stations with more funds. Members of the Association are, therefore, asked to write to their Senators and Representatives in Congress and urge them to favor an increase in that section of the appropriation for the United States Forest Service, under the Department of Agriculture, which provides for general expenses as follows:

"For silvicultural, dendrological, and other experiments and investigations independently or in co-operation with other branches of the Federal Government, with states and with individuals, to determine the best methods for the conservative management of forests and forest lands, $78,728."

Urge that this appropriation be increased to $250,000, which amount will provide for such forest investigation as may be necessary.

CAN SAVE WHITE PINE

THAT the white pine, most valuable of American softwoods, can be saved, and not made extinct by the dreaded blister rust was the consensus of opinion at the international blister rust conference in Albany, when experts from all parts of the country gathered to discuss means of stopping the spread of the infection. If proper care is taken to prevent its spread there is no reason why the reforestation of this country with white pine can not be continued. Methods of treatment of the infected tree, but particularly of stopping the carrying of the spores to uninfected trees were discussed. Dr. L. H. Pennington, head of the Forest Pathology Department of the New York State College of Forestry at Syracuse, told of important tests in the Essex County region, to determine the distance to which the disease could be carried, and he gave his opinion that the blister rust spores were able to carry the infection to a much lesser distance than has commonly been supposed, thus making the protection of uninfected stands of pine much simpler. He urged that the greatest care be taken, however, to completely eradicate the currant and gooseberry bushes which participate in transmitting the pest within the danger zones. Prof. John W. Stephen, head of the Silviculture Department of the New York College of Forestry, told of practical investigations in Wisconsin. Clifford L. Pettis, chief forester of the New York Conservation Commission, presided at the conference.

LASTING QUALITIES OF CEDAR

AN ancient grave marker dug up near Seattle by workmen clearing land, disclosed a remarkable testimonial to the long life, durability and resistance to decay possessed by Washington red cedar.

The lettering on the marker, which remains distinct, showed that it must have been placed in commission nearly fifty years ago. There is no name on it to indicate over whose grave it was erected, but the date of death is inscribed as Dec. 30, 1868.

When unearthed the cedar piece was several feet under ground, indicating that it had lain there for many years. Although conditions were most favorable for decay, the marker remained in an almost perfect state of preservation. While it was weathered to a deep gray color, fungi and insects had given it a wide berth.

The Southern Pine Association

maintains a department of Cut-Over Land Utilization, which, with the U. S. Department of Agriculture and other agencies, is seeking to determine the best uses which can be made of the cut-over lands in the Southern States. The logical division for the utilization of these many millions of idle acres are—

1st—AGRICULTURAL DEVELOPMENT

2nd—LIVE-STOCK RAISING

3rd—REFORESTATION

An informative and reliable book describing in full the opportunities afforded on the cut-over pine lands of the South has been published, and is distributed free to all requesting it.

SOUTHERN PINE SERVICE ASSOCIATION

SOUTHERN PINE ASSOCIATION

NEW ORLEANS, LOUISIANA

DISSTON-SAWS



NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree.

LANHAM, MD.

By Mrs. Charles Howser; Ensign Joseph F. Bellak.

FLORENCE, ALA.

By Woman's World War Memorial Association; Jesse Adams, John T. Barkley, William Calvin Brewer, Willia M. Creasy, Percy Crunk, T. A. Howell, John Wesley Hall, Herbert Lee Hill, Henry Holland, Jacob Heupel, Price Hill, Luther Hine, Private Lovelace, Elmer McFall, George Edwin McFall, Alonzo Nugent, William E. Param, Henry Smith, Thomas Clayton Underwood. Clyde Wilcoxsen, James E. Wesson, Frank Lester Young, Zacharia Agnew, Private Hardin, Beatrice Martin, Green Thompson.

AUGUSTA, GA.

By Woman's Club; Captain Louis Legarde Battey, William P. Battle, Jr., Jack Carr Byrd, Claude A. Barker, Corp. Barney Bivens, William J. Cooney, James W. Crowe, Lieut. Thomas Cumming, Thomas Edward Cockrel, John Allen Davis, Foster Davenport, A. S. Edwards, Clarence Epps, Lieut. L. B. Evans, Aaron Franklin, Ernest G. Gay, Eulie T. Goolby, Harry Green, O. M. Horne, Corp. O. R. Hardeman, James B. Hester, Forest H. Harrison, Sgt. John W. Hogan, Sgt. Willie E. Jones, Corp. Sheppard Jordon, Josh Keener, Anthony P. Knuck, Andrew Kep, William Edward Kent, Archie McCorkle, Jasper H. Morris, Sgt. T. A. Murphey, I. M. Moore, Daniel D. Morris, Willie Phillips, Frampton Page, John Neeley Page, George T. Pittman, Burr Wise Powell, Norman C. Pflager, Willie Ready, Ashley Rushing, John Henry Reese, Samuel Smith, Thurman Lee Swancy, Owen Alderman Sims, Fred E. Turner, Cadet Moultrie Clyde Trowbridge, Marvin G. Wright, Harry V Wells, Carl Williams, Mack Walthour, Lieut. Lee Walton Verdery, Willie Caldwell, Frank Monroe, Willie Hickson, Dan Gibson, Ernest Key, David Thomas, Johnny Walker, Otis Jones, Henry Garrett, Tom Reese, Ben Cumming, Willis Harris, Willie Ramsey.

THOMPSON, GA.

By Women's Club; Henry Earl Williams, Joseph B. Wilson, A. K. Forney, Holly Harrison, Fred Lee Isdell, Daniel J. Brown.

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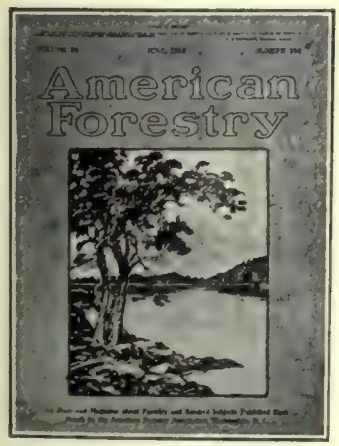


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* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

PROF. BROWN IN EUROPE

PROF. Nelson Cortlandt Brown, of the faculty of the New York State College of Forestry, at Syracuse, has gone to Europe for special consultation on forestry problems with the new Czecho-Slovak republic, chiefly regarding the disposition or management of the Hapsburg crown lands, which reverted to the new republic when the ancient Austro-Hungarian monarchy fell.

TENNANT LEAVES HOO-HOO

ANNOUNCEMENT has been made of the resignation of E. D. Tennant as Secretary-Treasurer of the Order of Hoo-Hoo, in order to take up his new duties in connection with his recent appointment as vice-president of the Commercial Journal Company, publishers of *Lumber*. Mr. Tennant is followed as secretary of Hoo-Hoo by H. R. Isherwood, Retail Service Representative of the National Lumber Manufacturers' Association, and well and widely known throughout the industry.

OFFICES OF MARYLAND STATE BOARD OF FORESTRY DESTROYED BY FIRE

The offices of the Maryland State Board of Forestry in McCoy Hall, Johns Hopkins University, Baltimore, were destroyed by fire on November 27. With the exception of some publications and exhibit material, which was kept in another building, everything was destroyed, including valuable records representing several years of field study and investigation, a report in manuscript form, 700 lantern slides, some 1500 photographic negatives, about 3000 photographs, a forest library of some 200 volumes, together with a nearly complete set of state publications on Forestry, and publications of the Federal Forest Service.

One of the most serious losses was that of the files containing the mailing lists and official records, which cover a period of htirteen years of State Forestry work. In some respects it is necessary to begin the work over again, although the published reports contain a record of fair accomplishment.

Since the mailing list will have to be entirely remade, it is important that those who wish to secure future publications of the Maryland State Board of Forestry should make application to be entered on the new mailing list

ILLINOIS BARS ALL EASTERN CHRISTMAS TREES

ILLINOIS did not receive any Christmas trees from the New England States this year as importation of New England Christmas trees into Illinois was forbidden by proclamation of Governor Lowden. This prohibition was announced as an effort to prevent the ravages of the Gypsy moth among the evergreens of Illinois. The moth infests Christmas trees in Maine, New Hampshire, Connecticut, Massachusetts, Rhode Island and Vermont and is doing much damage.

Three other proclamations were issued by Governor Lowden, one forbidding importation of chestnut trees from certain states in the east; another forbidding importation of barberry bushes, and the third forbidding importation of pine trees from states in the east.

THUNDER MOUNTAIN NOW IN NATIONAL FORESTS

CONGRESS has set apart 1,116,000 acres of land in Idaho known as the Thunder Mountain region as national forest lands. This great tract, difficult of access and having not over 1 per cent of its area suitable for agriculture, has for years been the scene of destructive fires and devastation due to overgazing. It is now to be added to the Payette National Forest which adjoins it on the south and west and the Idaho National Forest, which adjoins it on the north and west.

BOUQUETS

"I am much interested in your announcement of a Foresters Edition. I shall undoubtedly want both editions. I shall surely want the technical forestry articles and should be very sorry to miss the interesting articles on birds, etc."

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Shade Tree Commission, Kearny, N. J.

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B. E. FERNOW.

"I was very much interested in your November number of the Foresters Edition of AMERICAN FORESTRY. I think that it will suit foresters and those who are financially interested in timberlands better than the more popular edition."

J. S. HOLMES,
State Forester of North Carolina.

FOREST FIRE LOSSES.

FOREST fires are costing the West five or six million dollars every bad year, says a recent issue of The Forest Patrolman, published by the Western Forestry and Conservation Association at Portland. Much of this loss is preventable. This association asserts that the wise expenditure of one per cent of this five million dollars could secure such public interest and so encourage fire preventative measures that forest fire causes could be reduced practically to lightning and incendiaries. Forest fire losses the past season were heavy in Montana and parts of Idaho, light in Washington and above normal in Oregon. California had severe fires late in the season so that complete data is not yet in with reference to her total losses. The expenses for protection of privately owned lands will be above the average for the season, due in part to the high cost of labor and supplies. The effort of private timberland owners to reduce fire loss is efficiently organized and has been generally effective. As a result of greater activity in law enforcement, many more convictions were secured this year under the fire laws than heretofore.

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

AT a meeting of the Quebec Forest Protective Association held in the Office of the Minister of Lands and Forests in Quebec, the question of clearing railroad rights-of-way was discussed at length. The Dominion Railway Commission requires that all rights-of-way of railroads under their jurisdiction shall be cleaned and kept clean, but on the Government operated roads this rule has not been enforced. It was recommended that the Dominion Department of Railways and Canals be asked to carry out this procedure which would help materially to lessen the fire risk. There has also been a move on the part of the Government to require holders of leased lands to clear a strip of land 100 feet back from a railroad right-of-way of logging debris, but the question comes up as to whether settlers along the rights-of-way should not also be compelled to clear a like strip, as often as they own lands adjoining and interspersed with those under license, and to clear one without clearing the other would be of no use. Railroad fires during the past season were very frequent. The question was also discussed of asking for legislation to compel everyone entering the forest to have either the badge of the licensee or a permit from a fire ranger so that those going into the woods would have sense of responsibility and also that the fire rangers could keep track of those travelling in their territory. The permits would cost nothing, and there is already a permit for such action in the Provincial Parks. The burning of all debris in the making of log roads, tote roads and colonization roads was also recommended, and also the fixing of minimum terms of imprisonment for infractions of certain of the fire laws. At present the maximum and minimum fines are set, and also the maximum terms in prison, but there is no minimum and the justices sometimes let a man off with an hour's or a day's imprisonment, thus making a travesty of justice.

At a meeting of the Forestry Advisory Committee it was recommended that the extra length allowed on logs for which no stumpage would be charged, in order to cover brooming of logs in rapids and rocky streams should be, for wood cut four feet to seven in length, two inches, from eight to eleven feet, four inches and twelve feet and up, six inches. Reforestation was also discussed and an important announcement by Mr. Piche, Chief Forester, of what he proposed to recommend to the Government, was made.

An interesting report of the Commission of Conservation on butt-rot in balsam will shortly be forthcoming. The commission, in co-operation with the Department of Entomology will build a laboratory at the field experiment station of the Laurentide Company, at Lake Edward.

Price Brothers and Company have engaged Lieutenant Vezine as a pilot and are sending him to England to buy two of the latest type flying boats for use in mapping and exploring their limits next summer. This is the third paper company to undertake the use of aircraft in forestry work.

Mr. Jean J. Guay, Assistant Forester of the Spanish River Pulp and Paper Company, is on six months leave of absence and is exploring timber lands in Newfoundland.

Messrs. Arnold Hanssen and G. A. Faulkner, will open an office in Montreal the first of the year, and will undertake timberland reports, cruises and surveys and other forestry work. Mr. Hanssen is a graduate of the University of Norway, the Kongsburg Forestry School in Norway, the Yale Forest School, and has been with the Laurentide Company since 1912. He served with credit in a hospital unit in France during the war. Mr. Faulkner is a graduate of the University of Maine, and has been some months with the Laurentide Company.

The experimental cutting of the Commission of Conservation in co-operation with the logging and forestry divisions of the Laurentide Company is progressing favorably. 9458 13½ foot logs, and 114 cords of nine foot logs have been cut to date and the slash burnt. Growth and volume studies are being carried out on the trees felled. The Quebec Government has been asked to set the operating area of this experiment aside as a forest reserve so that the results of the work can be studied continuously.

The new Farmer's Party in Ontario have taken over the reins of Government, and have put a plank in their platform for conservation and use of their forest resources. It is hoped that they will take this matter to heart and really give Ontario a good forestry policy. The Canadian Forestry Association has, for a long time, advocated the placing of all the Province timberland under the Forestry Branch, instead of having, as at present a separate non-technical branch to handle the work. Fire protection also needs to be made more efficient by the entire elimination of the patronage evil.

Messrs. Leavitt, Craig and Wilson attended the meeting in Syracuse where Colonel Graves spoke on his revised forest policy. After the meeting Ellwood Wilson and Lieutenant Graham, in charge of the aviation work of the St. Maurice Forest Protective Association, went to Rochester to discuss the subject of aerial photography with the Folmer and Schwing Division of the Eastman Kodak Company and their experts. The Eastman Company have done remarkable work in building aerial cameras, and in simplifying their operation, and they are now paying special attention to forestry work. With their assistance it is hoped to perfect the photographic end of this important work. A special study is being made of the interpretation of forest photographs and some progress is being made. It is too early yet to say just what can be read from these pictures about the stands of timber. Maps already made from them check up very accurately with ground work and give infinitely more detail and better ideas about a country. Burns are clearly defined, reproduction on burns shows plainly, lakes, Creeks, swamps and rivers show up well, portages and log roads where not too much overhung with trees are quite plain, and even when overhung can often be traced on the map. It is easy to distinguish between some species of hardwoods. The line of study at present being followed is the intensive study on the ground of lands which have been photographed. "Close ups" will be taken at low altitudes of areas which appear typical on the prints and panchromatic films with filters in order to get better color values.

In Canada, as in the United States, the problem of forest reconnaissance in order to determine the amount and location of available timber supplies is becoming more and more urgent. The Province of Nova Scotia was the first to take up the matter and under Dr. Fernow the work was completed. The Commission of Conservation, in co-operation with the Province of British Columbia, has made a rough reconnaissance and estimate for that Province, and has commenced the work in Ontario. New Brunswick has made great progress in mapping and estimating its Crown Timberlands, Much work has been done in Quebec by the Government and by private companies, but all over the Dominion much remains to be done in order to have a sufficiently accurate inventory for practical purposes. The position which Canada has taken in the newsprint industry makes it imperative to know how long our present supplies will last and what is coming on for the future. Aerial photography offers the best and most rapid, as well as the cheapest means of doing this work over the huge areas which have never been mapped or on others only partially mapped. In co-operation with the Department of Naval Affairs, and the Quebec Department of Lands and Forests, the Laurentide Company will attempt to map photographically 5,000 square miles of timber lands belonging to the Province of Quebec during the coming summer.

STATE NEWS

INDIANA

DESPITE the inroads which have been made on the timber in Ohio, Indiana, Illinois, each of these three states still has a large area—about 3,000,000 acres each—in farm woodlands, according to United States Forest Service figures. This represents between 10 and 15 per cent of the total farm area. Lumber production in these states has declined greatly in the last twenty years. In 1899 Indiana and Ohio each produced about a billion board feet of lumber; in 1918 each produced one-fourth of a billion board feet. In 1899 Illinois produced 375,000,000 board feet; in 1918 the output had declined to 50,000,000 board feet.

NEW YORK

FACED by the fact that New York State is cutting from three to five times more timber than is grown there each year, and that the vital manufacturing establishments which depend upon unfailing supplies of forest products are migrating to other fields, the Conservation Commission has just made public a rational forest policy for the State, the adoption of which is urged in order to offset the imminent menace of a wood shortage. The policy, which is contained in a letter mailed by Conservation Commissioner George D. Pratt to the Governor and members of the Legislature for their consideration between now and the rush of the legislative session, constitutes a unified plan to meet the necessity for a proper protection and development of the forest lands of the State, as well as to replenish the fast waning supply. It is the first broad-guage response to the warning made by Colonel Henry S. Graves, Chief of the United States Forest Service, based upon a timber survey to meet war needs, that timber in the east is rapidly approaching an end, and that the remedy for the situation is one of the most fundamentally important questions with which we have to deal today.

The measures now suggested as a solution of the problem in New York State have, according to Commissioner Pratt, already in their main features been thoroughly developed and tested by the Conservation Commission in the two greatest forested regions of the State.

Among the first steps advocated is the division of the State into ten forestry districts, each under the supervision of an experienced forester. He would act under the direction of the Division of Lands and Forests of the Conservation Commission in the same way that district rangers in the Forest Preserve counties now administer their forest areas. In matters relating to forestry, such a man would occupy a place similar to that occupied in agriculture by the Farm Bureau agents, whose work has been so proved a success.

"A full summary of the benefits," the letter says in conclusion, "that will accrue to New York State upon the adoption of a broad plan for forest development will reach into practically every phase of life of the people. Hardly an industry can be named, which is not in one way or another dependent upon supplies of wood. With the development of our water resources, the need for wood supplies will be even greater. A decrease in the production of wood products and a relocation of mills elsewhere will all tend to increase the cost of products to the consumer. We must accordingly maintain and develop our forests, and thus protect our industries, and employ our labor. We must insure permanency in industry, and not allow parts of the Empire State to become deserted villages. This is a social and economic problem, which a broad plan of forest development can do much to solve. The next session of Congress will see bills introduced to stimulate this work throughout the entire country, and to co-operate with those states that take constructive action. By the initiation of the work here outlined, New York will benefit by the Federal co-operation under laws already passed, and will place herself in the vanguard of those commonwealths that realize the exhaustibility of forest resources and the necessity for conservation and replacement."

OREGON

THE request by the Air Patrol Committee, of the Western Forestry and Conservation Association that air patrol of forested areas be established for all Northwestern states the 1920 season is epochal in forest protection endeavor. For the past two months the committee of which C. S. Chapman, Forester for the Association, is chairman, and which is composed of representatives of Federal, State and private interests in all states from Montana to California, has been working with local air service officials in the planning of intensive patrol for the areas in question. The War Department has now been asked to furnish for the 1920 season 5 complete observation squadrons of 18 planes each, or 90 planes for this work, with the required number of pilots and observers.

It is planned to have planes equipped with wireless so that location of fires observed may be immediately sent to receiving stations which the Signal Corps



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is requested to establish. Forest officers will be stationed at each base, sub-base and landing field to act with the air service and tie up the work so there will be no lost motion or lack of efficiency. The committee points out that the area to be patrolled embraces one-half the merchantable standing timber in the United States. It also embraces some 80 million acres of government owned timber and probably from the standpoint of value 80 per cent of all government owned timber outside Alaska. Protection agencies feel that air patrol gives promise of being one of the greatest factors in solving the fire problem. They likewise believe that the opportunity given to train pilots and observers while these officers are performing useful service in conserving government property should insure favorable action by the War Department in the establishment of the patrol as requested.

OHIO

"CATALPA trees should not be planted in northern Iowa," says G. B. McDonald, of the forestry department of Iowa State College, in response to many inquiries about the planting of this tree to secure material for fence posts.

Nine out of every ten catalpa groves in northern Iowa fail as do also the osage orange groves. The winters are too severe and these trees are easily killed. There are some successful catalpa groves in southern Iowa, but not many. Cottonwood grows quicker and does well on overflow and waste land. In five to seven years a good many fence posts can be secured from a cottonwood grove. These posts, however, must be treated with a suitable preservative. One-sixth of an acre of cottonwoods planted each year will furnish 200 good fence posts annually.

PENNSYLVANIA

HON. Robert. S. Conklin, Commissioner of Forestry, states that 150 bushels of Black Walnuts were planted this fall in the Mont Alto nursery in Franklin County. The seed was good in quality and should produce one hundred thousand seedlings which will be available for planting next year. Most of the trees will be distributed to private planters throughout the state, who are anxious to start groves of this valuable tree. the wood of which was in such great demand during the war.

of Forestry for planting anywhere within the state. The only charge which the applicants must satisfy is the cost of packing and shipping which is usually less than 50 cents per thousand trees. From 500 to 2,500 trees should be planted per acre. Two men can plant one thousand trees per day.

Millions of thrifty and valuable chestnut trees have been killed in Pennsylvania during the past ten years by the chestnut blight, which was imported from China. It has done already an enormous amount of damage and unfortunately no satisfactory preventive measure of control is yet known. In many regions where this tree once prevailed only a few subnormal living specimens remain. Commissioner Conklin recommends the immediate disposal of all dead and dying chestnut trees, and the restocking of such areas by planting valuable forest trees.

The most promising development of the past year in the field of reforestation is the interest mining companies are taking in forest tree planting. Fourteen different companies already have committed themselves to the practice. During the past four years mining companies have planted over 450 thousand trees, of which number 250 thousand were set out during 1919.

Pennsylvania stands in front of all other states in the development of the state-owned forest land and in the degree to which it co-operates with private owners in the care and development of their forest land. The growth of forest tree planting by private owners of woodland has been phenomenal. The work was first undertaken in 1910, and its wonderful growth is shown in the following table of the number of trees planted each year: 1910, 66,374; 1911, 25,360; 1912, 66,854; 1913, 47,770; 1914, 108,685; 1915, 115,577; 1916, 1,471,875; 1917, 1,812,997; 1918, 2,186,899; 1919, 3,038,085.

Coal companies are beginning to see the value of reforestation. They are experiencing great difficulty in procuring suitable mine timber at a reasonable cost, and they realize that it is now possible to grow timber of usuable size on their own holdings, at present almost entirely unproductive, long before the supply of their mines will be exhausted. Commissioner Conklin predicts that mining companies will plant at least five hundred thousand trees during 1920, and announces that the Department of Forestry is co-operating with them by supplying the planting stock, and giving technical advice free of charge.

TEXAS

ON November 14 the Texas Forestry Association held its fifth annual meeting at the Chamber of Commerce in Dallas, and it was the most successful meeting the Association has had. For the benefit of Association members the proceedings of the meeting will be reviewed in the "Texas Forest News." Arrangements are being made to print the full proceedings of the meeting in circular form for distribution to Association members, legislators, and other interested Texas citizens.

Mr. Tom Finty, Jr., of the Dallas Evening Journal, gave the opening address. Mr. Finty expressed the belief that the people of Texas are being impressed more than perhaps we realize by the work of the Forestry Association. President Jones made his annual report, reviewing briefly the progress made since the last meeting, and expressing confidence in the future development of forestry work in Texas.

Following the papers there were three resolutions passed:

1. A resolution advocating the teaching of Forestry in the Schools of Texas.

2. A resolution approving Colonel Graves' plan providing for a national forest policy as a basis upon which to construct a suitable forest policy for Texas.

3. A resolution endorsing the work and plans of the State Forester, and pledging the support of the Association to the State Forester's policy.

VERMONT

THE practice of rational forest management on a large tract of timberland in Vermont has been initiated, not by the Federal or State government, but by Middlebury College on the Battell Forest, its 30,000 acre tract of forest land in the Green Mountains. The timber on this tract consists, for the most part, of a mixed stand of old growth spruce and hardwods—chiefly yellow birch, beech and maple—grading into pure spruce on the upper slopes.

In the first sale of timber that has been made under the management of E. I. Terry, the forest manager, the operator has agreed to dispose of the slash by lopping tops of both spruce and hardwood. In all future sales the trees to be cut will first be marked by the forest manager and the slash disposed of. Old and decadent trees, even though of little or no value for lumber, will be cut in order to make room for thrifty young growth, and all cut over areas will be promptly restocked with spruce, either by natural seeding or planting.

A forest survey, which will include the mapping and estimating of the entire forest, has just been completed.

"The best way to dispose of hardwood slash," says Mr. Terry, "is to work up the limberwood and all parts of the trunk unfit for saw-logs into cordwood, wherever a market renders such disposal possible. This is now the case on many parts of the Battell Forest. If there is no market for cordwood, the branches must be lopped so that they will lie close to the ground and soon decay. The best way to dispose of spruce slash is to pile the branches and burn the piles when the ground is covered with snow."

WASHINGTON

"1919 one of the most disastrous years in the point of forest losses the North Idaho Forestry Protective Association has ever experienced," announces W. D. Humiston, of Potlatch, Idaho. "The actual destruction of timber was not so great as 1910, but the area burned over was larger and the cost was greater this year. The worst years previous were 1910 and 1914, but the estimate is one and a half more than in 1910." An expenditure of approximately $116,000 for fire fighting was reported by the Pend Oreille Timber Protective Association for 1919, according to the statement of T. L. Greer, secretary-treasurer of the association, at the regular monthly meeting of the North Idaho Forestry Protective Association at Spokane.

The Potlatch Timber Protective Association reports a financial loss by fire of $22,153 during 1919. This includes 66 fires and covered an area of 1,211,150 acres.

The total number of fires in the territory of the Clearwater Timber Protective Association was 74, entailing a cost of $22,164 for fire fighting for the year. The season's total expenses were $46,603. The timber loss for the territory was 3,635,000 feet.

The total net receipts for the National Forests in Montana during the fiscal year ended June 30, 1919, were $380,171, according to figures announced from the forestry headquarters. Twenty per cent will be paid to the state for schools and roads in the counties in which the forests are situated. In addition, 10 per cent will be spent on road and trail construction within the forests themselves.

BOMBS IMPRACTICAL FOR FIGHTING FOREST FIRES

Ingenious, imaginative persons have recently proposed as a method of fighting forest fires that gas bombs be dropped from airplanes. Officials of the Forest Service say that this suggestion is entirely impractical. There is no analogy between the suggested method and the use of poison gas bombs in fighting, because a fire can not be "poisoned" but must be smothered. Although one part of a poison gas to one million parts of air might be sufficient to kill soldiers, yet 750,000 parts of inert gas to a million parts of air probably would not suffice to put out a fire.

The only kind of gas which will assist in stopping a fire, forest officials declare, is an inert gas that will neither burn nor support combustion, such as nitrogen or carbon dioxide.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

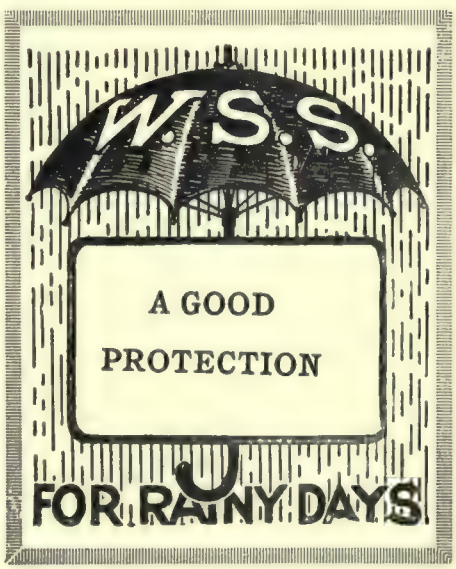
Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

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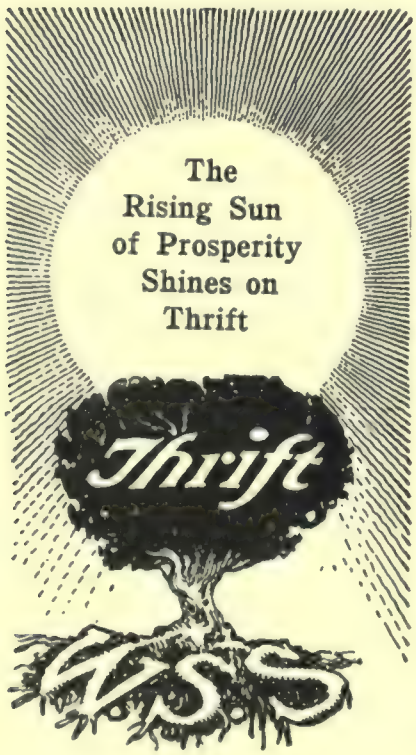
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FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

Carl A. Kupfer, of the United States Forest Service, recently gave the Forestry Club a very interesting account of the work of the Forest Products Laboratory at Madison during the war. Two exceedingly well arranged reels of moving pictures, showing different aspects of the work in timber testing, airplane glue research, dry kiln experiments and wood preservation tests were a feature of the evening's program.

At a meeting of the Forestry Club around the camp fire in Telegraph Canyon, Colonel W. B. Greeley, assistant forester, gave an interesting and inspiring talk on the progress of forestry in the United States.

After six months of deliberation, the Board of Regents has appointed Lieutenant-Colonel David P. Barrows to the presidency of the University. Colonel Barrows is essentially an out of door man who knows intimately and loves the mountains and forests of California. Forestry and conservation can be sure of constructive interest and support from the new president.

The end of the fall semester marked the close of an epoch in the life of the Forestry Division at California. With the opening of the new term on January 13, an entirely new arrangement of courses went into effect. This is made possible by a radical revision of the curriculum of the College of Agriculture, which allows more latitude in the selection of courses of interest to foresters.

Ansell F. Hall, '16, will assist Professor Mulford with the course in General Forestry. He was granted leave of absence by the National Park Service, until May 15. He is regularly stationed in Yosemite National Park.

The forest library has been enriched by the purchase of over one hundred volumes of French books on forestry. These include a nearly complete set of the "Revue des Eaux et Forets" and such standard texts as "Technologie Forestiere" by H. Nanquette, "L'Amenagement des Forets" by L. Tassy and "Traite de Sylviculture" by A. Jacquot. The acquiring of these books was made possible through the kind cooperation of Lieutenant Colonel Woolsey, who arranged for their purchase during his stay in France.

Among the books presented to the library by Hall, '16, and Ryerson, '16, are the rare two-volume folio edition of the "Statistique et Atlas des Forets de France" by Lucien Daubree and an exact pen and ink copy with English translation of the working plan document for the management of the forest of Gerardmer.

UNIVERSITY OF MONTANA

AN interesting feature of the Ranger School this winter will be a Rangers council or seminar in which studies will be made of the problems of the District Ranger.. Their problems will be presented and discussed by the rangers, and the meetings will be organized and entirely controlled by themselves, only such advice or expert help being brought in as is requested by the council.

An unusually strong organization of experts and professional workers in various lines of forestry, lumbering and grazing have been secured to assist the regular teaching force in the ranger school. Students will, during the twelve weeks of the school, come in contact with and receive instructions from some forty experts in the various branches of their work.

An unusually large number of applications for registration in the Ranger School have been received in advance of any published announcement of the short course for this year—prospects point to a large enrollment from the southwestern districts for the new short course in grazing.

Assistant Forester W. B. Greeley, of the Washington office of the Forest Service, recently addressed the Forest School in a very interesting lecture on various problems of a national policy in forestry.

Mr. Greeley emphasized the fact that a timber famine would come about long before our forests were exhausted in a scarcity of timber rather than a complete lack of timber. He said that this famine was even now felt in the east where the large wood using industries were finding their supply of timber at an increasingly farther distance. Many of them are being forced to close down, Mr. Greeley stated, because of the cost of bringing in wood material from a great distance, and many of them are abandoning costly plants in order to move nearer a new supply of wood.

He foresaw that the northwest would become important soon in the pulp and paper industry.

The assistant forester feels that too little interest is being shown in reforestation and the restoration of forest growth to lands valuable only for forest growth. Timber is being cut rapidly and often wastefully, and is not being replaced. Our accessible timber of sorts upon which wood using industries depend will soon be exhausted with nothing being done to replace it. The supply of southern pines is even now nearly gone. Figures are not available to show how nearly loss by fire and other devastation balance new forest growth.

"Get forest growth!" says Mr. Greeley, should be the watchword of every forester.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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Destructive lumbering in the West (Courtesy of Forest Service)—Inserts: Waste through preventable decay.

Why Wood Preservation is Imperative!

The reckless extravagance in the use of our timber resources has reached the stage where the subject is one of serious concern to the American people. This growing anxiety is reflected by a recent memorial addressed to the President and Congress by the General Assembly of the State of Illinois, from which the following extracts are quoted.

"Whereas, The United States during the last half century has witnessed the reduction of the forests in one region after another. The white pine forests of Pennsylvania, New York and New England disappeared nearly a half century ago. Likewise the pine forests of the Lake States for the most part were obliterated before 1900. The southern pineries which for 20 years have been the main supply of lumber for Illinois and other central states will, according to statements recently made by authoritative sources, be to a large extent exhausted within the next ten years.

"The effect *** has been the closing of nearby industries, *** the shifting of local population to new centers, involving heavy penalties upon both the industries and the people. As another result the country has observed the area of cutover timberland increase to *** 228 million acres. ***

"These important industries including the manufacture of railway cars, etc. *** are now threatened by the exhaustion of the forests from which their supplies have been drawn. *** Therefore, Be it resolved, by the Senate of the State of Illinois, the House of Representatives concurring therein, that the Fifty-first General Assembly of the State of Illinois urges the attention of the President and the Congress of the United States to the present timber situation and recommends that, without delay, there be formulated such a National program of forestry as will insure the future timber supplies required by the industries of the country."

(LUMBER WORLD REVIEW 5/25/1919)





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EDITORIAL DEPARTMENT

A NATIONAL FOREST POLICY

IN the discussion of remedies let us not lose sight of the disease. A multiplicity of forest programs advocated by various agencies and from diverse standpoints is a healthy sign of awakened interest and concern. But it is important that we keep our bearings.

The disease is forest devastation. Its effect is a slow sapping of national strength—through the steady exhaustion of the national timber supply. The effect will become fatal when, through the shortage and high cost of timber, the United States is reduced to the level of western Europe, when wood is priced as an imported luxury, when not only manufactures and trade are handicapped by lack of it but the comfort of our own people and the efficiency of our agriculture are straitened by its scarcity.

It is unthinkable that the United States will accept the necessity of curtailing largely, sooner or later, its use of timber. Abundance of wood for home and farm use, for varied manufactures and for export trade has been a primary factor in our commercial supremacy, and it is a factor which we are not going to surrender. The problem must not be met by using less and less wood, down to the level of civilized existence, as France has been compelled to meet it. It must be met not by decreased use but by increased production. It must be met in the American spirit of development, of enterprise, of an organized and far-sighted handling of our resources that will supply the future requirements of a continued liberal use of timber in national development and industries.

Increased production is the cry of the times. Increased production from land is just as important as increased production by human labor. The idleness of one hundred million acres of forest land is just as serious today and more lasting in its effects than the idleness of thousands of skilled mechanics. It is nothing short of national folly to go on, year after year, devastating millions of acres of forest land and failing through bad organization, through inadequate public effort, and through a lack of clear definition of public and private responsibility to produce one of our most essential raw materials.

Return then to the nub of the question, which is to stop forest devastation and to put waste land at work growing trees. Dismiss at once the use of cut-over land for farm crops or other forms of production besides growing timber. No one questions it when the land is needed for such purposes. But until it is actually employed otherwise, let it be kept at work producing timber. Twenty per cent of the forest land is in public ownership; and it goes without saying that the State and Nation should systematically replant denuded areas and grow timber on all of their holdings under the best standards of technical administration. Eighty per cent of our forest land is in private ownership. A part of this 80 per cent should be acquired by public owners, Federal, State or municipal, particularly areas where costly methods of reforestation are unavoidable. But it is patently impossible for the public to acquire all of the forest land in the United States or enough of it to produce the quantities of timber which we need. There are too many demands upon the public treasury to make such a program practical or effective. The timber which we must have cannot be grown without the active participation of the private owner of forest land.

Obviously, the public has a large interest in preventing the devastation of privately owned land. The correction of certain factors which contribute to forest devastation rests primarily with the public. Among these are methods and practices in taxing woodland which render it difficult for the owner to grow young timber; the fire hazard in forest regions and its corollary, the inability of owners to insure timber or young growth; the difficulty in obtaining loans for long-term forest enterprises at rates commensurate with the duration and character of the enterprise; and the lack of sufficient information in a form for practical use on how to treat forests in order to get certain results.

There are also specific things which must be done in the woods. The first is to fire-proof cutover areas as

far as that is practicable by some form of slash disposal. The second is to detect and put out forest fires. In many parts of the United States these two measures in themselves will largely or wholly stop the devastation of forest land. A third, more rarely needed, is to reserve in cutting enough trees to reseed or restock cutover land where otherwise it would become waste. In these steps also the public should co-operate. But the public cannot and should not do it all.

A measure of responsibility must be accepted by the owner of the land. Whether the owner should be responsible solely for preventing his land from being a menace to his neighbors, through the accumulation of slashings, or from being a menace to the economic welfare of the State and country, through idleness, it is not the province of this brief resume to determine. The point not to be lost sight of is that the obligation and the burden of perpetuating our forests are mutual. The public will carry its share, but only if the forest owner himself is in step. Public support for fire protection and tax adjustments cannot be obtained unless the men and the industries primarily interested in the land do their part and the joint effort actually succeeds in growing timber.

It will not be possible to do everything at once. Slash disposal and fire protection should be the first objectives and may have to be pushed in advance of others. But there should be no half-hearted measures, no obscuring of the ultimate object to be attained. Whatever the line of attack, it will be effective only in so far as forest growth actually replaces forest devastation.

LIGHT BURNING IS A MISTAKE

IT is anxiomatic that the protection of forests from fire is the first step in any forestry program. It is equally axiomatic that the only kind of protection which promotes forestry in the long run and which therefore has a place in a national program looking to the future is protection which conserves and promotes tree growth. The owner of merchantable timber may protect his property from fire as the owner of a coal mine would do; but if the timber property is protected simply as a mine and the methods of protection destroy its capacity for growing timber after the virgin stumpage is cut, it is simply a phase of timber mining and not forestry.

Every one recognizes the utility of fire properly controlled, as a means of forest protection. The burning of slashings on cut-over land is often essential not only to eliminate a menace to adjoining areas of uncut timber but also to protect the young growth already existing on the cutting. It may even be wise to burn up a small part of the existing young growth in order to clean up the slashing and give the young trees which remain a reasonable chance to escape future fires. In certain forest types, like the Douglas fir areas of the Cascades, where the new forest must be grown from seed in the ground, the clean burning of whole cuttings under careful control is good forestry. In most of our pine, spruce and balsam forests, on the other hand, and in many of our hardwood forests, part or all of the new timber growth is on the ground at the time of cutting; and forestry demands that that growth be preserved as far as possible and that such firing as is done be very closely controlled, in brush piles or otherwise.

The public conception of forest protection must be a conception of forests so protected that they will be perpetuated. The protection sentiment which is developed by educational activities must be predicated not upon simply protecting an exhaustible resource like a mine but upon protecting forests so that they may continue to grow timber. Any theory or proposal which directly or indirectly undermines this basic conception of forest protection is putting the country back rather than ahead in forestry progress and must be fought without quarter.

A number of large land-owning interests in the Western States, particularly in California, are advocating the so-called light burning of timberlands at frequent intervals. It is asserted that by burning pine forests every few years the woods will be kept clean of inflammable debris without injury to the merchantable stumpage. The constant burning out of small growth, underbrush and litter would thus supposedly protect the forest from serious conflagrations. Advocates of light burning even assert that pine forests protected by their system will not burn and that the smaller trees themselves will survive carefully reglated firing in the proper season of the year. Light burning is thus advocated as the solution of the protection of pine forests, as a substitute for the whole protection system of fire detection and suppression, of close control of the use of fire, and of a public sentiment alert at all times to keep fire out of the woods which the Forest Service and many State and private agencies in the West have expanded so much effort and money to develop.

This proposal is like the announcement of a nostrum which will cure tuberculosis and which at one stroke eliminates the necessity for the sanitary regulation of cities, for tuberculosis sanitaria, for fresh air, nourishing food, and every other means employed by medical and hygenic science to combat the white plague. It is exactly the repeated fire, beginning in the Indian days, which has steadily eaten up the pine forests of California and other Western States. The National Forests of California today contain nearly two million acres of land once heavily timbered but now reduced to brush patches as a result of repeated

burnings extending over fifty or a hundred years. It is impossible to fire these pine forests on any extended scale without destroying at least a large part of the small growth and at the same time eating out the butts of the old trees little by little. A careful investigation has shown that on the areas deliberately fired by advocates of light burning, the extent of the destruction is essentially the same as in any ordinary fire in the pine woods.

Light burning means nothing more nor less than the continuance of the frequent ground fire, which steadily and irresistibly destroys the western pine forests. At its best, this practice is simply a measure for the protection of old timber. It is part of the process of timber mining, which values nothing but the old growth and turns land into unproductive waste. To the gutting of the forest by heavy cutting, it adds the gutting of repeated ground fires. An area cleaned by light burning has no advance young growth to replace the virgin timber after cutting. Its general application would mean that our western pine forests would be replaced by brush fields unless enormous expenditures are made for artificial planting.

Forestry practice in the United States doubtless will develop further uses for carefully controlled fire as a means of protection. The extent to which this method can be used in the southern pineries is a matter to be determined by investigation. In the western pineries, where the tree species and climatic conditions are totally different, the experience of the Forest Service in fifteen years of fire protection, timber cuttings and forest renewal makes the basic facts of the situation absolutely clear. Light burning has no place in a system of forestry which seeks to perpetuate our western pine forests and make them continuously productive. The plausible arguments advanced in advocacy of light burning make this proposal exceptionally dangerous. It tends to weaken the confidence of the public in a genuine system of fire protection. It tends to weaken the support given by timberland owners to joint and organized protective efforts, such as the Forest Service and many western associations have been largely successful in bringing about. It tends to prevent progressive fire protection legislation in the Western States. It tends to encourage incendiarism. It is essentially a challenge to the advocates of a national policy of forestry for it strikes directly at the effort to keep timberlands productive rather than permit them to become waste. The American Forestry Association and the United States Forest Service will therefore oppose the light-burning theory with all the resources at their command; and they both feel that the issue which this proposal has raised should be met squarely by the forestry interests of the United States.

INCREASE IN FOREST RESEARCH NECESSARY

THE time has come when we must grow timber. Under the pressure of necessity we must make the best of the knowledge we have of methods, imperfect though that knowledge may be. The handling and perpetuation of our forests in the last analysis must, however, rest on a solid foundation of careful and thorough forest investigations. Too few people today realize the value and importance of agricultural experiment stations in furthering the interests of the farmer and showing the way to more scientific and more profitable farming. An even smaller number recognize as yet that forestry as a pursuit, closely resembling agriculture, can be furthered in much the same way. Results are obtained with farm crops in one, or at most, two or three years. It takes only a few years to produce new varieties of farm crops, and the farmer obtains the first year an increased return from the use of scientific methods developed by the experiment stations. If investigations in agriculture are important under these circumstances when the mistake of one season may be corrected the next, how much more important it is that the growing of trees, involving decades or perhaps a century, should be scientifically conducted and that experiments along this line, also requiring very long periods, should be initiated at once? One may not hope to plant a tree and also see it ready to cut for lumber. All the more reason, then, why the person who starts the business should have a clear, scientific understanding of what the results are likely to be. On the National Forests in the West a start has already been made to meet the demands of forest management for accurate knowledge by establishing several experiment stations. The work at these stations should be materially strengthened. In the East, however, where the economic conditions are more ripe for the handling of the forests as a permanent resource, there is, in spite of a large number of agencies and forest schools interested in the problem, a lack of co-ordinated effort toward securing accurate scientific knowledge.

The establishment of several forest experiment stations in the East to solve the problems of New England, of the Southern Appalachians, of the South Atlantic and Gulf States, and of the Lake States, is particularly urgent. This need has been long felt and can no longer be neglected. Every timber owner, every forester, forest school, and the various wood-using industries which are vitally dependent upon the forests should see to it that forest practice in the East should be based on the results of investigations conducted at forest experiment stations, just as agricultural practice is becoming more

and more grounded on the results of the agricultural experiment stations. The Federal Forest Service should be provided with funds sufficient to establish and maintain such stations independently or in co-operation with States or other agencies. The present appropriation of the Forest Service for purely forest investigations is ridiculously small; it barely amounts to 1-100 of 1 per cent of the capital represented by the timber alone on the National Forests of the West and only 2 per cent of the present income from those forests. Uncle Sam, one of the greatest timber owners in this country, in his expenditures for forest research is far behind many industries in this country and the governments of many European countries. The size of the present appropriation is still more ridiculous when, in addition, Uncle Sam's duty to furnish private owners with the information they need to grow timber is considered. This duty should be as fully recognized in forestry as in agriculture.

As the original and present source of a large part of the nation's well-being, the forests of America must be sustained, to the end that our descendents shall have and enjoy lumber, paper and water as we have had and now enjoy them; that the pleasures and inspiration of the forest shall not be lost to the people; that no part of our land be given over to waste, but all made productive according to its quality.

That there can be no forests, and no forestry, where fires are allowed is self-evident. That every community and every interest must maintain a forest fire service is not generally recognized. The nation, the states and every private interest must unite to provide the money and the leadership that are required to make the effort effective. To hold a forest, mature or immature, for future revenue or enjoyment is a speculation, not an investment, unless fire control is established.

Forestry, its aims and agencies—fire control, silviculture, state economy, are still little understood. Habits of neglect and wastefulness attach to our woodlands and are deep-rooted. An active, prolonged campaign of education, in which the nation and the states shall co-operate, is imperative.

As four-fifths of our woodlands belong to private owners who rarely are willing to incur the risk, or to make the investment necessary to provide future timber, it is advisable that the nation, the states and many municipalities acquire public forests. But since this is not generally practicable, or can be undertaken in only a limited way, means must be found to induce owners to practice such controls as will insure the continued productiveness of their forests. A wise plan would offer the owners of true forest land an alternative of maintaining it on a productive basis or selling it to the public. Usually adequate protection against fire would be sufficient inducement.

There is little foundation for the many claims that our forests are over-taxed. Their increasing value does induce higher assessments, and higher assessments often leads to realizing fellings; yet real evil lies in the uncertainty as to when the upward movement will stop, and in the inequities that frequently are created. Though forestry considers the public interest before that of individuals, it seeks no favors at the expense of any other class of property. It asks only that the tax burden be adjusted to the long periods required to produce timber trees. This means that a part, at least, of the annual levy should not be collectible until the trees are marketable, and that such deferred tax be *predetermined*. No one can be expected to invest money in growing trees unless he can calculate, and discount if necessary, his future obligations.

Upon forest lands that have been devastated—usually by fire, a new forest can be established by planting. In such cases the work should begin as soon as fire control is assured and be carried forward systematically. Yet these conditions are relatively rare. If logging is done with reasonable care and fire kept out afterwards, nature will establish new forests which can be improved by a forester's skill. Be it remembered that nature is a ready, if not very skilful forester; that many million trees, much less a tree, or a few trees, planted here and there will not renew, or replace, the forests that we destroy; that if we stand for planting at least ten young trees must be started for every mature tree that is felled for lumber. Planting at high cost cannot be avoided in some localities; the effort everywhere must be to secure natural rather than artificial forest renewal. Again fire control will go far.

Mountainous and very rocky land is clearly indicated as fit only for forestry. Every other kind—wet, dry, sandy or alkaline, may be agricultural, or pastoral, or forest under present, or reasonably anticipated future conditions. Lack of information regarding soil values has given opportunity to land sharks and prevented forest renewal on land that has no possible agricultural future. The soil surveys made by the Federal Government in co-operation with a number of states should be extended so that there may be definite knowledge of what should be permanent forest land and what is fit for conversion to other uses.

TREE SEEDS PRESENTED TO OUR ALLIES

THIRTY-SIX million forest tree seeds for reforesting their war devastated lands were presented by the American Forestry Association to France, Belgium and Great Britain on Thursday, January 15. The presentation was made at Boston, on the Common, by President Charles Lathrop Pack, of the American Forestry Association, and the seed was formally received for their respective governments by J. F. J. Flamand, the French Consul General; Redington Fiske, the Consul General for Belgium, and by Captain Gloster Armstrong, the Consul General for Great Britain.

In presenting the seed Mr. Pack said: "A hundred years from now these trees will tell the glory of all those who heard the call of humanity from across 3,000 miles of water. We on this side are planting memorial trees and "Roads of Remembrance," but this gift to help reforest the battle areas and areas in Great Britain which were sacrificed to war's demands will, I believe, do more



A PORTION OF THE SHIPMENT OF SEEDS TO OUR ALLIES

The contribution of forest tree seed by the American Forestry Association to France, Belgium and Great Britain comprised approximately 36,000,000 seeds. The photograph shows only a portion of the shipment, the remainder of which will be sent later. President Charles Lathrop Pack, of the American Forestry Association, is at the right of the photograph with a British flag in his hand.

than anything else toward cementing the friendship that was born of war and baptized in blood.

"As a memorial, as a sign of ever renewing life, as a symbol that they have not died in vain there can be no more fitting monument than the 'tree that looks at God all day and lifts its leafy arms to pray.' The American Forestry Association is proud indeed to collect and present this gift to your governments. May every tree seed prosper and grow and carry the message not alone of the American people to future generations, but may each one of them carry the greater message of Him who heard humanity's call and answered."

The seed was purchased with money contributed by members of the Association and some was also presented by the States of New Jersey and Ohio. Other seed has been offered by Louisiana and North Carolina, and will be sent when received.

More seed would have been purchased had it been possible to secure it, but the 1919 crop was unusually poor and the supply was small. France wanted white pine, but none was to be had; France and Great Britain both desired Douglas fir, but it was impossible to secure a large quantity of it.

France and Belgium will use the seed sent to them for replanting forest lands in the war zone, while Great Britain, which cut down fifty per cent of her woodlands to supply her war needs, will use the seed for part of the great reforestation work which will start in the spring.

In the shipment were the following amounts: Douglas fir, 20,000,000 seeds; western larch, 9,000,000 seeds; tideland spruce, 3,000,000 seeds; Englemann spruce, 2,500,000 seeds; white fir, 700,000 seeds; sugar maple, 550,000 seeds; white ash, 300,000 seeds; tulip poplar, 120,000 seeds; rock maple, 110,000 seeds; red oak, 40,000 seeds; black oak, 4,500 seeds; scarlet oak, 3,000 seeds.



DONATION OF FOREST TREE SEEDS TO OUR ALLIES

At Boston On January 15, 1920, the American Forestry Association presented to France, Belgium and Great Britain a quantity of forest tree seed for replanting the areas devastated by war. President Charles Lathrop Pack, with an American flag in his hand, presenting the seeds to Consul General Captain Gloster Armstrong, of Great Britain, Counsul General J. F. J. Flamand, of France, and Consul General Redington Fiske, of Belgium.

In accepting and acknowledging the gift, Captain Gloster Armstrong, the British Consul General, wrote:

"I wish to express to you my appreciation of your courtesy and kindness at the presentation of the very generous gift of forest seed by the American Forestry Association to Great Britain and the British Government and its representatives are most grateful."

C. Symons, Counsellor of the Belgian Embassy wrote:

"These seeds will be welcome in our country where

the forests have been devastated to such an extent during the war, and the Belgian people will be most thankful to your Association and grateful for the part played by it in our work of reconstruction. Permit me to extend, on behalf of the Ambassador and also on behalf of my compatriots which your Association will thus help, the expression of my sincere thanks and of my deep appreciation."

Acknowledgment was also received from the French embassy.

Doners of the Fund.

Donations to the reforestration fund were received from: L. F. S. Barnard, W. W. Davies, Eugene Klein, W. E. Knox, Mrs. H. D. Peck, Wallace Improvement Association of Cranford, N. J.; Mrs. L. P. Houghton, Frank C. Demmler, William A. Robinson, Miss J. B. Thacker, Miss Eva A. Klemm, George C. Beach, Harry L. Burrage, Mrs. Wm. M. Chase, Miss F. M. and Mrs. L. W. Hazen, Miss A. B. Law, William Meigs, Miss P. L. Hosmer, A. J. Willes, William K. Brown, Charles E. Falconer, E. M. Halcombe, Mrs. Samuel B. Jones, William O. Bates, George H. Hines, Mrs. B. Henry, Mr. and Mrs. G. Earle Kelley, H. D. Markley, E. S. Brownsill, Donald Hill, Thomas Bolster, Florence Bratenahl, Civics Class, N. S. H. School; E. I. Howard, Mary H. Lord, Mrs. E. C. Marmon, Mrs. T. M. Guthrie, G. W. McAllister, L. Dennis, Mrs. F. B. Huntington, Dr. C. A. Hammann, H. L. Lewis, I. J. Merritt, Mrs. H. W. Adams, Jr., Fred Burke, Theodore Foulk, Mrs. A. F. Hager, Mrs. Daniel Beckwith, Mary B. Jewett, F. M. Kirby, Hiram W. Sibley, Miss A. H. Pybas, Mrs. Charles Peabody, Mrs. R. W. Walker, Miss A. Wilson, Paul Watkins, Richard Bennett, Isaac S. Swift, William Gray Purcell, Mary E. Converse, Jacksonville Public Library, Anna Handil, T. S. Wynkoop, F. B. Williams Cypress Company, Henry Allifler, E. H. Simmons, M. R. Hohen, J. Levering, F. E. Mamm, Ora Gales, W. J. Ritterkamp, Grace S. Cover, Mrs. Nelson Penn, H. D. Lloyd, Charles H. Tillhoman, J. Cole, E. S. Webster, Miss H. Slicer, R. G. Kirk, L. L. Winsor, Mabel Stewart, F. D. Gundry, L. Blake, B. H. Pollock, Christian Norton, Poveshiek Township Women's Club, Garden Club of Philadelphia, H. S. Upson, C. W. Miller, Julia B. Douglas, Robert Carlisle, O. O. Charlton, "Friend," Garden Club of Philadelphia, B. J. Lang, B. H. Dickson, Jr., R. L. Winthrop, M. P. Toulmin, C. H. W. Foster, Arthur Hobart, J. E. David, Mrs. Charles P. Putman, Mrs. S. Warren, Mrs. J. H. Beal, F. W. Upham, C. Hutchinson, Anna W. Phelps, S. Hutchins, F. S. Winston, J. B. Ames, G. Whiting, Ernest W. Bowditch, Mrs. C. L. Edgar, A. H. Hinkle, K. L. Wilks, S. L. Sewall, E. P. Welles, C. M. Griggs, S. B. Davol, M. S. Devereux, Charles H. Frost, R. Sayre & Company, Bryan Lathrop, W. P. Corey, H. D. Tudor, Henry H. Proctor, H. E. Raymond, George P. Metcalf, Herman F. Vickery, William C. H. Lloyd, William A. D. Foster, Elizabeth L. Cheney, F. W. Barth, M. B. Johnson, Albert L. Baily, J. G. Thorp, Donald M. Hill, E. B. Haskell, George Biddle, Maude E. Stafford, Mary P. Seaverns, Henry H. Collins, E. L. Benson, Ernest Bullitt, G. Aerken, T. Hewson Bradford, William D. Bishop, Austin Valli, Francis R. Allen, Josepha W. Douglas, Evergreen Public Library, A. S. Alsop, Paul Connor, R. J. Carlisle, Mrs. Richard C. Cabot, John B. Henck, Mrs. John Shaw, Miss Coles, E. D. Clark, Anna Bogert, Emily V. Clark, Mrs. Samuel Chew, Mr. and Mrs. Allston Burr, John C. Phillips, Mrs. Raymond Durham, Elizabeth Flagg, Walter S. Bogert, Miss C. S. Baker, Mrs. J. S. Disston, Jr., Mrs. Charles Davis Clark, Mrs. John Gribbel, Mrs. C. T. Burkham, Kenneth D. Magruder, L. S. Thomas, John D. Rockefeller, Jr., Mabel B. Ward, M. E. D. Magruder, C. B. Cooke, W. C. Symington, Miss Bella Bosworth, S. D. Ferounfelter, J. P. Morgan, Edith C. Borden, Lucy C. Brown, May Hale McFarland, Albert Wilde, Jane B. Haines, Helen H. Clarke, Mrs. A. V. H. Kimberly, Mrs. George A. McKrulock, Mrs. Charles G. Weld, H. K. Pancoast, Mrs. H. N. Van Voorhis, Miss Mary Whitehouse, Helen Ward Banks, Reed Vroegindewey, Austin Cary, Mrs. Alfred Winsor, J. R. Day, Mary Olivia Casement, A. B. Spreckles, Ansley Wilcox, C. McC. Reeve, Jesse A. Baldwin, C. A. Randall, Prof. H. L. Fairchild, William J. Nevins, Mrs. Ben Allen Samuel, Clare G. Addison, F. A. Delano, Miss Annie H. Cheney, Mrs. I. P. Anderson, A. B. Crossland, Mrs. Robert F. Grigg, Mrs. U. C. Egan, Mrs. G. B. Case, J. E. Dalgleish, Bertha Estry, Mrs. G. S. Achilles, R. T. Garrison, Jr., Mrs. R. Friday, Louise L. Brown, Mrs. R. G. Butler, Anna C. Bird, M. C. MacDougall, Miss G. A. Wood, F. S. Adams, Mrs. William H. Bliss, Mrs. Samuel Chew, Mrs. S. F. Brown, Mrs. George R. Clegg, Mrs. Frederick Cunningham, Elizabeth E. Ellmaker, Mrs. W. E. Clark, Edward B. Field.

The Trees of France

All honor to the trees of France,
That grew so tall in days of yore;
Hewn down in hate by Hun advance,
Those martyred forests are no more.

All honor to the trees of France,
So proudly cut to save their land;
Oh sad, regretful circumstance,
But not by ruthless Teuton hand.

All honor to the trees of France,
Her stately forests yet to be;
Whose seeds are planted not by chance,
But sent from friends across the sea.

—Elizabeth T. McGaw

RECLAMATION WORK A VITAL FORESTRY PROBLEM

R. S. MADDOX

FORESTER, STATE GEOLOGICAL SURVEY, TENNESSEE

ALL foresters and lumbermen, as well as many other citizens, recognize the increasing scarcity of lumber. This scarcity is evidenced in many ways. In the first place lumber prices are soaring everywhere. Even prior to 1914 the man on the street had begun to comment on the high cost of lumber compared to 20 years ago. Furthermore, a class of timber found in logging yards today and commanding a good market would have been considered too inferior for use at any price a few years ago. The destruction and use of lumber in the world war added tremendously to the scarcity of timber, its immediate demand, and therefore, to its higher price. Since the war we are faced with almost prohibitive prices, and yet the end of these high levels is not in sight. This condition must be attributed not merely to increased demand and post-war readjustments but primarily to a scarcity of timber. Records of the annual output of lumber in many states show a distinct and in some cases a heavy falling off in the past ten years. For instance, Tennessee's output in 1917 (the latest record) was approximately one-half of what it was in 1909. It is generally known that the centers of production in this country have narrowed down to states on the Gulf and Pacific Coasts. In other words, the greater part of the United States today is harvesting second-growth timber. It must be recognized that this situation has been greatly augmented by the methods employed in handling our once forested lands. It is the old question, lack of proper conservation. This is a big subject with many phases, one of the most important being the reclamation of waste lands.



GULLIED LAND IN EASTERN TENNESSEE

This gullied mountain land is too steep for cultivation, and is of the type which should never have been cleared of its timber.

The rate at which land has been virtually wasted is prodigious, and the lack of general serious concern about it is only too manifest from the amount of such lands and their apparently total neglect. In the sum total of these abused areas forest fires can be charged with a good round per cent of damage, but there is another form of waste which comes from wrongful clearing of land or improper management after clearing and which might be classed under three heads, viz: first, the clearing of

lands too steep for cultivation; second, clearing of lands too shallow for cultivation; third, neglect of lands whose productivity could have been maintained by proper management. In the hilly and mountainous sections of Tennessee it is often easy to follow the steps by which waste lands result. For instance, the lower slopes having been cleared first gave way to "breaks" or small gullies and at the same time became somewhat "worn" or depleted of fertility. It was decided by the owner to clear a strip of the adjoining woodland above. After a few years the older field was turned over to pasture or waste. The new ground being steeper yielded more quickly to erosion and the next step was to clear more new ground still higher up which often took in the entire hilltop. It can be stated that much of the first and second classes of waste exist because of the old idea that land is not worth anything to the owner unless he can use it—meaning, unless he can cultivate it or graze it. The trees are, therefore, from his point of view, in the way, and thus many an acre of timbered and "timber" land has been turned to waste.



WASTE LAND

This should have been maintained in crop production. The grade of slope is low. Western Tennessee.

The third class of land results from neglect. This is agricultural land and could have been kept productive. Improper management, the exhaustion of fertility, and neglect of incipient erosion



CULTIVATED MOUNTAIN LAND IN EASTERN TENNESSEE

This mountain land has been cleared and cultivated for a brief period and then turned into pasture. Though yet new ground, as is shown by the stumps, the soil is rapidly sloughing off.



ANOTHER AREA OF WASTE LAND IN WESTERN TENNESSEE

This was before any work was done upon it, in 1917. Brush dams were built, the banks plowed off, and locust trees set out in the spring of 1918.

have left much land in a waste condition and taken the owner into the woods for more new ground. Regardless of the comparative cost of this operation as against maintaining the older fields, the tendency to clear more new ground instead of protecting and building up the existing cultivated sections has helped to swell the large total of waste acreage in the state. Whether the damage comes from fire, wrongful clearing of steep slopes and shallow soils, or from neglect, the result is a needless drain upon lands that should for the present at least grow timber. It is evident that so long as lands are permitted to waste away, the forest must pay the penalty. Woodlands are the only source from which a new acreage of tilled land can be obtained, unless the waste is reclaimed. Redemption of waste lands will necessarily put a heavy check upon further clearing and should at the same time promote soil maintenance and soil building. There is enough cleared land in Tennessee for the present, even more than required. Broadly speaking the only justification for further clearing is a real need for more agricultural acreage through an increase in population, and this, only after conscientious care has been taken of the waste areas.

Reclamation may be costly, but the lack of it in the end is costlier. On waste sections such as prevail in Tennessee, reclamation is guaranteed by proper effort. It has passed the experimental stage and is a success. Many of these lands can be very shortly turned into growing post timber, a valuable product. Some can be made into pasture, while others can be redeemed easily for cultivating crops. In fact a great proportion of this last class can be redeemed with as little or less cost than that of establishing the same acreage of new ground.

Foresters everywhere must take hold of the waste land problem. Reclamation saves woodlands from destruction just as surely as protection against fire saves them. It will not only return much abandoned territory back into forest growth directly, but where the land is reclaimed for agricultural purposes it gives to the farmer new fields and prevents his clearing an equivalent additional area of woodland.



A YEAR AFTER RECLAMATION

This is the same area of waste land photographed in July, 1918, after the locust trees had been set out.

NATURAL REGENERATION OF FRENCH FORESTS

BY THEODORE S. WOOLSEY, JR., L. d'H., D. S. O.

FORMERLY LIEUTENANT-COLONEL ENGINEERS, U. S. A.; MEMBER INTERALLIED WAR WOOD COMMITTEE, PARIS, 1917-1919

Illustrations by Commandant Thiollier, French Army. (Service des Eaux et Forets.)

OVER three centuries ago Colbert, Minister under Louis XIV, warned France that some day she would perish for want of wood. At that period wood was used largely for fuel, as well as for building; the coal and cement age had not commenced. Each locality depended upon nearby supplies because transport to any distance was impracticable. Under these conditions Colbert's warning was heeded and in 1669 he was able to put into effect a Forest Code, which insured the protection of French forests. Under the stress of the Napoleonic wars it is true that the resources were further depleted but in the eighteenth and nineteenth centuries Demontzey and Bremontier firmly established the practicability of reforesting the dunes and the eroded Alps. During the great war French forests have been heavily cut, and have been destroyed by shell fire to such an extent that it will take a century to make good the loss. Timber supplies cannot be replaced until the plantations mature and it takes two centuries to grow commercial oak; a century and a half to produce spruce or silver fir logs, and a century to grow pine. Hardwood coppice produces fuel in twenty to thirty years, but modern industry requires coal or electricity for power, instead of wood or charcoal.



A LARCH STAND IN THE FRENCH ALPS WHERE THE SOIL MUST BE WOUNDED TO SECURE NATURAL REGENERATION.

Had France allowed the destruction of her forests during the nineteenth century the Allies might have lost the war. Not only were the wood supplies required locally, to economize ocean tonnage and railway transport, but the forests themselves were needed as a line of defense. Without such forests, as Compeigne, Villiers-Cotterets, Coucy, St. Gobain, Foret de la Mont de Reims and others it is probable that the German drives in 1918 would have been more successful than they were—and they nearly succeeded as it was. It is at least significant that the German advance on Paris in June, 1918, was stopped in the forests of Compeigne and Villers-Cotterets. The value of forests as a means of defense is so recognized that the French Forest Code provides that no private forests can be denuded, in the frontier zones, without the specific approval of the civil and military authorities.

The French forester has always been a close student of soil conditions, seed crops, and methods of seed germination because his ideal has always been to obtain the natural regeneration of forests, and today, high labor costs will make artificial forestation almost prohibitive. The Germans have favored the clear cutting of stands, followed by planting or sowing. They argued that natural regeneration was the more costly in the end, because to naturally regenerate forests took fifteen to twenty years, and that even then the results were unsatisfactory. Probably both schools of technique are correct. With the Northern climate of Germany the artificial replacement of stands is often obligatory but in France, with plenty of rainfall, rich soil, and species that produce seed crops in abundance, natural regeneration has succeeded and will be continued, except where normal forest conditions must be restored in the devastated war zones and where the damages of past over-cutting have not yet been completely repaired.

The French forester is a student of nature. He has been taught to *"Imiter la nature, hater son oeuvre, telle es la maxime fondamentale de la sylviculture."* His simplest problem is where he can clear cut the entire stand and yet secure his second crop without planting; his difficulties increase as the number of cuttings must be varied in degree, and in amount, so as to tempt the next generation of trees to gain a footing in competition with grass, weeds, and undesirable species. But he



MARITIME PINE GROWN ON THE SHIFTING SAND DUNES IN THE GIRONDE, FRANCE.

recognizes that success cannot always be obtained under these difficult conditions without assisting nature. Consequently he is ready to wound ground covered with grass, so that the seed can germinate in the mineral soil, or he may have to cut back briars, or heather, which is crowding out the commercial stand.

In the latter part of the eighteenth century the Landes and Gironde was fast becoming waste land. The sand had been blown over forests and fields so that even villages had to be abandoned. Today this area is in productive maritime pine forests, producing lumber, mine props, ties and turpentine. These forests ripen in seventy to eighty years and upon maturity are clear cut. After lumbering, the branches and unmerchantable tops are left on the ground; the sun opens the cones and the sand is quickly covered with a stand so dense that it must be thinned to reduce the competition for light. Then as the seedlings grow into saplings, the excess trees are tapped to death to produce resin and mine props and to favor the development of the crowns of the final stand. Maritime pine must have large, well developed crowns to produce resin, the major crop. Fires must be kept out and there are protection belts along the ocean to prevent the drifting of sand.

The sessile oak in the rich valley of the Adour, where there is an annual acorn crop, can be clear cut and reproduced with the same ease but in the sessile and pedunculate oak stands (often mixed with beech in Central France) the regeneration must be by progressive cuttings. With oak the technical objective is to produce large timber requiring 180 to 240 years to fully mature. Oak is an intolerant species so seedlings must have light for their development, while the beech, on the other hand, requires for a time a protective cover of older trees, against frost and sunlight. If the mother stand were clear cut, the ground would run to weeds and the oak and beech would be only partially successful, because good seed years are six to eight years apart. Under these conditions there are three successive fellings. The seed felling aims at starting the seedlings, the development of the crowns of the seed trees and the partial removal of the merchantable crop.

According to the teaching of Boppe, a great French silviculturist, all trees, other than seed trees, whose foliage extends to the ground and is, therefore, suppressing seedlings, are removed; beech, or hornbeam, which often forms a valuable understory, in order to preserve soil conditions up to the time of the seed felling, is cut. If the soil is covered with weeds, they are cut level with the ground as are also oak advance growth which would not do for future regeneration. The soil after a seed felling must be cleared of all low growth.

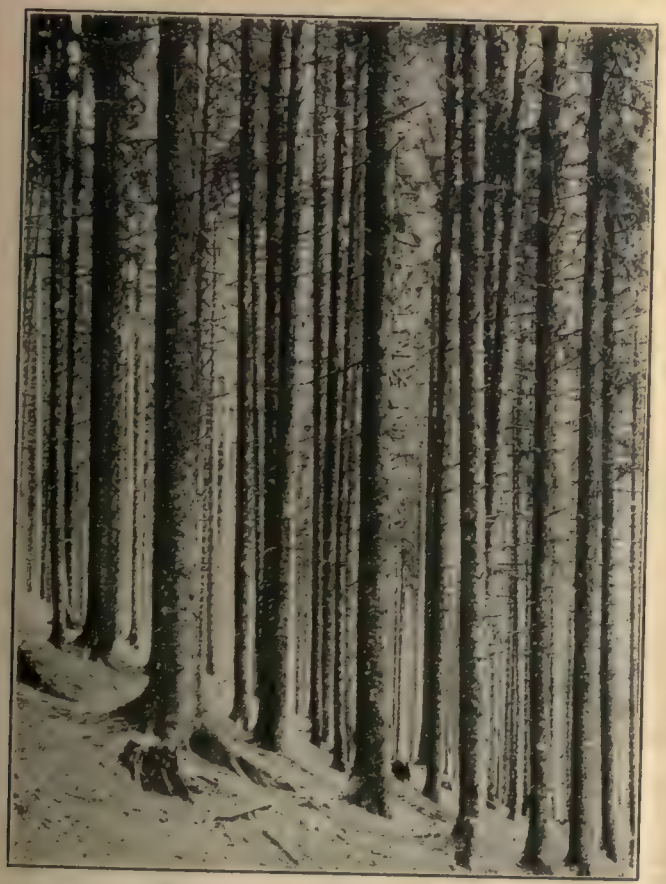


A SEED FELLING IN THE STATE FOREST OF HEZ-FROIDMONT, FRANCE.



METHOD OF DEFENSE AGAINST DRIFTING SANDS IN THE LANDES, FRANCE.

If necessary, the surface of the soil is loosened by wounding it. A successful seed felling is where there are one or two seedlings per square yard. Often there is practically a carpet of young oak. The next step (secondary felling) is to *gradually* remove the seed trees and to *gradually* free the existing seedlings without causing too much damage. These secondary fellings in oak stands are usually two or three in number. Care is taken not to expose the existing seedlings to late frosts and not to damage too many seedlings in the lumbering operations and to retain enough seed trees in localities where seedlings have failed. The removal depends primarily on



SUCCESSFUL NATURAL REGENERATION OF SILVER FIR AND SPRUCE IN FRANCE



A MATURE STAND OF SPRUCE AND SILVER FIR IN THE JURA, FRANCE, SECURED BY NATURAL REGENERATION.

the condition of the ground. If the seed crop is poor, it may be necessary to again cut back the weeds and to have resort to wounding the soil. If, on the other hand, the seedling growth is very luxuriant, cutting can be much heavier. The result of the secondary fellings is to increase the growth and development of the seedling crop and to enable them to maintain possession of the ground. As soon as the young crop is complete and the



A SELECTION FOREST IN HTE. SAVOIE, FRANCE.

first seedlings have developed into saplings, it is time for the final felling. This felling merely removes the remainder of the seed trees at one stroke, since it is rarely advisable to hold over a few seed trees even where regeneration may be lacking in a few spots. When seed trees are held over, it means that very valuable timber decreases in value, since as soon as these mature oaks are isolated, epicormic branches develop, the crown deteriorates, large branches die and there is great danger of rot or damage from insects. A feature of oak and beech naturally regenerated is the maintenance of the soil in good condition and suitable mixture of beech in the understory. The tolerant beech always has a tendency to take possession of the soil, and, therefore, it is often necessary to favor the oak. This can be done by reserving more oak seed trees, in the seed felling, and by cutting the beech in the understory; by hastening the secondary felling and making it rather open wherever oak seedlings have established themselves. Otherwise, they may be crowded by the tolerant beech. The seeding of the oak may also be increased by wounding the ground so as to bare the mineral soil. Then, when the seedlings are freed from the competing weeds and briars, the oak can be favored. In the thinnings, which commence when the oak is thirty to forty years of age, it can be assisted in its competition with the beech.

In fir stands, advance growth almost always exists, therefore the seed felling is really a light secondary felling, since its object is to allow this advance growth to develop. This first secondary felling, or seed felling, is made very conservatively so as to remove the cover gradually and not to expose the seedlings to drying out or to



ADVANCE GROWTH OF SILVER FIR IN FRANCE READY FOR THE REMOVAL OF COVER.

permit weeds to take possession of the soil. Even if suppressed for a number of years, fir seedlings have the ability to develop into good trees after the cover has been removed. The other secondary fellings which follow should also be "dark" since a gradual removal of the cover is essential. On the other hand, the final felling should always be complete on account of the danger from windfall and on account of the damage which



SECONDARY FELLING IN THE FRENCH STATE FOREST OF HEZ-FROIDMONT.

results to the old isolated trees from drying out. This method has been used successfully for generations and may be studied in the famous State forests of Perseigne, Berce, Blois, Hez-Froidmont, Senouches and Belleme, all within a day's motor trip from Paris.

In the high mountains a somewhat different procedure must be followed with the silver fir or spruce. Here the objective is not solely the production of lumber. The slopes must above all be protected to avoid damage by erosion. Therefore a part of the mother stand must always be left standing and much the same method followed as can be viewed in any of our virgin stands, where trees die, or are windthrown and the openings then fill up with seedlings, or weed growth. The forester removes these mature trees before they are decadent. Nature is improved upon. He determines the age when trees are ripe and periodically cuts every tree, *or group of trees,* that has reached maturity. Regeneration by this selection, or group selection method, as it is termed, is easier with silver fir, a shade enduring species, than with spruce, which requires some sunlight for development.

According to Boppe: When in mixture, advance growth of fir is quite common under the old stand. It is, therefore, necessary to fell here and there old trees in order to enable the spruce to profit by the light and establish itself in the center of the openings. While the advance growth of the fir has the advantage of age, the spruce seedlings develop more rapidly and make an excellent mixture. The more you want to favor the spruce the larger the openings should be made. It is also advisable to favor it by wounding the soil. The mixture can be regulated in the cleanings and thinnings that follow. Soil preparation is often necessary in progressive clear cutting, yet in France the sentiment is everywhere in favor of natural regeneration, preferably without the additional expense of artificial soil preparation. But the success of natural regeneration depends on the proper number and location of trees bearing seed, the right amount of light or shade for the development and existence of the young seedling, as well as upon proper texture of the ground free from weed cover. It is only under the most favorable conditions that some kind of soil preparation is not necessary, for successful *spruce* regeneration. In theory the forest could wait until natural regeneration came in without assistance. In practice the regeneration would often be incomplete; it would come in slowly, and seed trees valuable for timber of the highest quality would decrease in value and become mere fire wood. Even with very full seed crops some kind of assistance may have to be given natural regeneration usually for three reasons: (1) Because of a dense vegetable cover which prevents the seed coming in contact with the mineral soil; (2) Because of an excessive cover of undecomposed dead needles, or (3) Because the surface of the soil is too compact.

In the United States there are three schools of forest sentiment, or policy. The lovers of primeval forests want to spare all three for the sake of their beauty. They do not consider whether trees mature and die and go to waste. On the other extreme is the lumberman who buys forests for profit. After stripping off the merchantable timber he lets the soil take care of itself if he cannot sell to a land speculator. The state proposes the *via media.* Grow timber as a crop and cut the stand when it ripens. This should be the forester's golden rule. Let us profit by the example of a country like France, and use nature to help us in our task.



THE CROP OF OAK AFTER NATURAL REGENERATION

THE ANNUAL MEETING

RESOLUTIONS outlining the essential features of a national forest policy and calling upon Congress and State Legislature to give earnest consideration to legislative measures to secure such a policy were adopted at the annual meeting of the American Forestry Association, held in New York City on Tuesday, January 13.

The resolutions stated that:

WHEREAS, For nearly a year the American Forestry Association has urged the need of a national forest policy, has conducted a campaign for discussion of its various phases, and by nation-wide publicity has centered the attention of the public upon the necessity for such a policy because our forests are disappearing faster than they are being reproduced. Be it

Resolved, That the American Forestry Association declare itself in favor of a material increase in federal, state and municipal forests and of adequate federal and state legislation which, through forest fire control, public education, the arrest of denudation and promotion of conservative cutting, more equitable tax laws and adequate insurance of forest investments shall provide for the perpetuation of our forests and assure a timber supply for our future needs as well as forests for the protection of watersheds and for purposes of recreation and public benefit;

And that the American Forestry Association call upon Congress and state legislatures to give earnest consideration to the need of a national forest policy and to legislative measures to secure it.

President Pack in calling the meeting to order complimented the members upon the fact that, despite the trials of war time, which caused many organizations, owing to loss of membership, to pass out of existence, the Association was able to hold its own, to retain its membership with losses which were replaced by new members and to approach the work during 1920 sound financially and stronger than ever before. He referred to the widespread publicity campaign which has aroused interest in forestry in every section of the country and to the great success of the campaign for stirring up the public to a realization of how essential it is to provide for the perpetuation of our forests.



AMERICAN FORESTRY ASSOCIATION DIRECTORS' MEETING, JANUARY 13, 1920.

Standing, left to right and facing the reader: Standish Chard, J. E. Jenks, Col. W. B. Greeley, Prof. H. H. Chapman. Seated, C. W. Lyman, Alfred Gaskill, President Charles Lathrop Pack, C. F. Quincy, Dr. Henry S. Drinker.

He also referred to the participation by an enthusiastic public in the planting of memorial trees, of roadside trees and of trees along "Roads of Remembrance," all earnestly advocated by the Association, and pointed out the value of this movement in directing attention to serious questions of forestry and in securing the support of the public for the program for a national forest policy.

He also emphasized the need, now so well known by the members of the Association and also by the general public, of providing for the perpetuation of the forests and predicted that the public demand for a national forest policy would result in securing the state and federal legislation necessary for such a policy.

On the presentation of the nominations for officers, Dr. Henry S. Drinker, President of Lehigh University, said:

"As a past president of the Association I desire to pay

our President, Mr. Pack, during the past three years, in the promotion of forestry interests in our country, and in the notable and valuable patriotic work done by him in the National War Garden Commission, a great war work, cognate to forestry, and carried on in close affiliation with our Association and under its auspices, but without a dollar of cost to the American Forestry Association. Also in the collection and presentation to France, Belgium and Great Britain without cost to the Association of tree seeds for reforesting the devastated areas. In the great war the United States put aside for the time all other interests to forward the cause of right and of world democracy. Our students left their studies, professors enrolled as war aids, clergymen served as chaplains, professional and business men put country before personal interest, and our American Forestry Association, under the leadership of Mr. Pack—and the United States Forest Service, under Colonel Graves and his able staff—showed by the work of the forestry regiments what an element of practical preparedness forestry had built up for avail in the time of national need.

"We have had at the head of the American Forestry Association a practical forester and lumberman in Mr. Pack, a business man of large experience and executive ability, and a gentleman of charming presence and tactful personality well fitted to forward and promote throughout our country interest in and support of the forestry cause, and we have in charge of our magazine, an editor, in Mr. Ridsdale, of great ability, untiring energy and resource.

"The American Forestry Association should not be run as an organization for the interest and edification only of its members who are professional foresters. It serves a great national educational mission in forestry through its wide membership and its well conducted magazine. If the Association was restricted to a purely professional membership and its magazine run as a technical journal, the influence of the Association among our people in promoting support for forestry in Congress and in our state legislatures and in combating measures antagonistic to forestry, would be very small. We owe it largely and mainly to the energy of Mr. Pack, and to his great personal liberality in the contribution of funds, that the Association has been able to organize so successful a campaign for enlargement of membership; and we further owe to him the telling publicity campaign for forestry and forest interests that has been so successful. We owe it today to ourselves to show Mr. Pack how we value and appreciate what he has done, and to give him our assurance of support in the continuance of his good and effective work."

The officers who were elected are:

President, Charles Lathrop Pack.

Vice-Presidents, Vincent Astor, New York; W. E. Colby, California; Coleman DuPont, Delaware; Dr. Charles W. Eliot, Massachusetts; Dr. B. E. Fernow, Canada; E. G. Griggs, Washington; Henry S. Graves, District of Columbia; Hon. David Houston, District of Columbia; Hon. Franklin K. Lane, District of Columbia; Dr. John Grier Hibben, New Jersey; Hon. Robert P. Bass, New Hampshire; Stephen C. Mather, Illinois; Hon. Thomas Nelson Page, Virginia; Filbert Roth, Michigan; Dr. J. T. Rothrock, Pennsylvania; Mrs. John Dickinson Sherman, Illinois; Hon. William Howard Taft, Connecticut; Theodore N. Vail, New York; Hon John W. Weeks, Massachusetts.

Board of Directors, Nelson C. Brown, New York; W. R. Brown, New Hampshire; H. H. Chapman, Connecticut; Standish Chard, New York; Hon. P. P. Claxton, District of Columbia; Dr. Henry S. Drinker, Pennsylvania; Alfred Gaskill, New Jersey; W. B. Greeley, District of Columbia; Chester W. Lyman, New York; Emerson McMillin, New York; Charles Lathrop Pack, New Jersey; Addison S. Pratt, New York; Charles F. Quincy, New York; E. A. Sterling, N. Y.; J. B. White, Missouri.

There was presented at the meeting by a committee consisting of E. F. Baldwin, R. S. Kellogg and P. S. Ridsdale, the following resolution:

WHEREAS, The National War Garden Commission, organized in March, 1917, by Charles Lathrop Pack, and conducted, directed and provided for financially by him until it ceased its war time activities on June 1, 1919, did a tremendous and unselfish public service in increasing the food supply of the United States during and following the war by inspiring the planting of over 5,285,000 war gardens and conserving great quantities of fruit and vegetables by canning and drying; and,

WHEREAS, The food thus produced was of the value of $1,200,000,000; and,

WHEREAS, The Conservation Department of the American Forestry Association through its officers directed this work, the Association was enabled to conduct this great war time activity which made it known throughout the world. Be it

Resolved, That the members of the American Forestry Association express their gratification that it was the President of the Association who directed and led this war time activity which so greatly added to the war-needed assets of the nation, and for which as a far-sighted patriot he is entitled to the heartfelt thanks of his fellow-citizens.

At a directors meeting, preceding the annual meeting, plans for an international forestry congress were discussed. It was proposed that the Association hold such a congress during the coming summer, providing it will be convenient for delegates from Europe, South America, Canada, Japan and China to attend at that time.

tribute of admiration today for the great work done by

DISCOVERY OF SUGAR ON DOUGLAS FIR

BY FRANCIS DICKIE

LONG before the first white man came to North America with his luxuries of sugar and tea and other food delicacies which today the Indians love, and long for when without, the Indians of at least one district on this great continent had a white sugar of a very rare and high quality, a sugar derived from the strangest, and an almost unbelievable source—from the foliage of the Douglas fir tree, growing in certain districts in the Province of British Columbia, Canada. Yet, remarkable as this botanical phenomenon is, the existence of sugar in such an unusual place as the foliage of a coniferous tree seems to have entirely escaped the attention of all the white traders, explorers, surveyors, missionaries and hunters who passed through the regions where it is found. At least no mention of it has ever come to light; nothing seems to have been written of it by those early pioneering whites who traveled through the region where the trees produce this sugar; and, undoubtedly, had these men known of it, they would most certainly have made some mention, because of the very unusualness of the occurence.

So, in spite of the fact that this sugar has been known to and used by the Indians for a great many years, it is only now that the following interesting scientific facts of this phenomenon in the plant world are made available through the investigations and experiment of Professor John Davidson, F. L. S., F. B. S. E., Botanist in charge at the University of British Columbia, Vancouver, Canada, who has recently made a careful study of the sugar deposits on the fir, and the conditions under which it is formed, by visiting some of the principal regions where grow these sugar bearing trees. Assisted by James Teit, of Spence's Bridge, British Columbia, who had spent the major portion of his years living in the interior of the Province, and who had an intimate knowledge of the country and the Indians, Professor Davidson gathered the data as to the districts where the sugar chiefly is found, the probable causes of it, and the other interesting matter which is the subject of this article, wherein for the first time the story of the discovery is made known to the general reading public.



A RARE PHENOMENON—SUGAR ON FIR

The sugar appears in white masses of different sizes, ranging from a quarter of an inch to two inches in diameter. The smaller masses form like white drops at the tips of single leaves, while masses of greater size scatter over the leaves and branchlets.

The sugar appears in white masses of different sizes, ranging from a quarter of an inch to two inches in diameter. The smaller masses form like white drops at the tips of single leaves, and also at times several of the leaf tips are imbedded in a larger drop. Masses of greater size scatter over the leaves and branchlets. Placed in the mouth the sugar is exceedingly sweet, giving a flavor comparable to the highest class of the manufactured article. For a moment it passes into a pasty consistency in the mouth. But quickly becomes entirely soluble under the action of the saliva. It is quite hard and dry, but with no tendency to stickiness, after the manner of coarse flour. The accompanying photo taken by Professor Davidson, is of a good average specimen of the phenomenon as it occurs on the Douglas fir in British Columbia. A very light rain is, however, sufficient to dissolve the sugar off the fir; but very often it recrystalizes on the ground. At other times it remains in a semi-fluid condition, and its food value is evidenced by the fact that flies and various other insects are attract-

ed to it and feed upon it. The principal regions where Professor Davidson's investigations show the sugar to be produced are in the hottest and dryest parts of the interior of British Columbia, between the 50th and 51st parallels, and between 121 and 122 longitude. These areas take in the Thompson River Valley, west of the mouth of the Nicola River, the district near the junction of the Fraser and Thompson Rivers at Lytton, and a small part of the Fraser Valley, above Lillooett. In the Kamloops district, the Nicola and Similkameen Valleys and the eastern part of the State of Washington it is also reported to occur.

On first viewing the phenomenon, Professor Davidson was inclined to think the sugar resulted from punctures made in the leaves by insects, probably aphides, as he knew the Tamarix mannifera yielded a mucilage-like sugar when attacked by the Coccus—as a result of which came the manna of Mt. Sinai. However, this idea was quickly dispelled when he found only healthy Douglas fir yielded a sugar harvest, ones practically free of any insect life. Thus the phenomenon was evidently the result of natural causes, turning the investigator's attention to an examination of hours of sunlight, amount of moisture usually existing and similar things. This resulted in the finding that in the above mentioned districts of the dry-belt on gentle slopes facing east and north in comparatively open areas where the fir trees got plenty of exposure to sun, the sugar producing trees chiefly grew. Where the firs stand densely, or where the trees are on fully exposed southern and western slopes the sugar is not generally found, as the ground in this latter area dries out very quickly. From this it was evident that moisture played an important part in the sugar's production when combined with certain requisites of sunlight. Where a great many leaves are exposed to the sun, as in the case of the firs standing on comparatively open areas on the slopes facing east and north, an abundant formation of carbohydrates occur in a day. In the ordinary course of nature's working these carbohydrates would be carried to the growing tissues or storage ones, which is the case on Douglas fir in heavily forested areas. But throughout the dry-belt region the trees receive a much greater amount of sunlight over a greater number of hours per day than in other localities where they grow. Here, in the dry-belt, the ground and atmosphere are also warmer, the air circulates more freely than in the coastal regions where the dense fir forests stand. Thus in the dry-belt where the firs are subjected to a long succession of unclouded days of blazing sunlight in summer, and where the soil condition provided warmth and moisture, the trees gather a great deal more carbohydrates than normally. The soil's increasing warmth over so great a period of sunlight permits the roots to maintain or increase activity and continue nocturnally. This increased root pressure, and cessation of transpiration, causes the leaves to become water-gorged. This water contains a sugar created by the reconversion of starch into sugar. But the warm, dry atmosphere existing even through the night in these dry-belt regions, quickly evaporates the water, and the sugar remains to form drops of various sizes deposited at the leaf tips, some of which so large they fall onto branches and foliage below, resulting at times in irregular deposits as shown in the photograph.

By reason of the necessity for a succession of sunshiny days to produce the sugar, the Douglas fir of course does not yield a harvest that could annually be depended upon. For, a couple of wet days, or a few cloudy ones are sufficient to disarrange those atmospheric conditions which make the sugar possible. A cloudy day would permit the tree to utilize in the regular way much of the excess sugar and to horde the remaining portion as a future food reserve. A day or more marked by a drop in temperature would check the labor of the sugar-forming cells in the leaves, and the diminishing of the soil's heat lessen the root activity, causing a diminishing in the exudation of the water and a lowering of the root pressure. Similarly a day of rain would still more lower the soil temperature as well as that of the atmosphere. For these reasons the sugar cannot be depended upon to yield an annual harvest. This the Indians knew, and in good years stored up as much of the delicacy as was obtainable. The following analysis, made by Dr. F. T. Shutt, Dominion Chemist, Ottawa, Canada, and by the Bureau of Chemistry Washington, D. C., where there is a laboratory specially equipped for the examination of saccharine substances, are of great interest by the high degree of constancy of composition the fir sugar, or manna, showed. It is still more interesting owing to the finding that it contains a large percentage of an extremely rare variety of sugar; indeed, this particular variety is more abundant in the product of the Douglas fir than any other known plant. It was formerly obtained from a shrub in Turkestan and Persia. Of this pure and rare trisaccharide the Douglas fir sugar contains almost fifty per cent. Thus, while the fir sugar will never play a part as a food supply, like the product of the cane and beet, it will likely eventually prove valuable for use in chemistry, and perhaps in other ways which the scientific experimenting conducted by those interested in the discovery will bring to light. And in the heart of British Columbia the Indians will still gather it as they did before the white man came. Unique as the discovery is, it is further remarkable that so long a time elapsed before it attracted scientific attention as related herein. Perhaps the Indians intentionally held the fact a secret.

Of this Douglas fir manna, as it is called, the weekly bulletin of the Forest Service, District No. 1, at Missoula, Montana, says: "An interesting phenomenon which few of us have probably observed is the occurrence of 'fir-sugar' or Douglas fir manna, which is occasionally formed during summer droughts, or in dry-belt regions on the leaves and twigs of the Douglas fir.

"According to information from published records which have been furnished by Dr. Weir, the manna is not the result of the activities of insects, but is a natural exudation from the tips of the needles. The manna is

said to crystallize in some instances, cementing the twigs and leaves together in conspicuous masses. A slight rain quickly dissolves the manna from the branches and it may be found recrystallized in patches at the base of the tree.

"A letter from the Madison Laboratory states that the manna from Douglas fir contains about fifty per cent of a sugar known as melezitose, which in small quantities is selling at $66 a pound. A correspondent had made a request for approximately ten pounds and estimated that three to five dollars per pound could be paid for the collection of this material. It was suggested by the Laboratory that on the basis of the price and yield of melezitose, a higher price than this might be paid.

"The Douglas fir manna cannot be relied upon as an annual crop. Dr. Weir has seen the manna but twice, once in the fall of 1915 somewhere along the Yaak River on the Kootenai, and in 1916, when he observed and examined a white, sweetish exudation from the branches of a Douglas fir near Metalline, Washington. He doubts very much if it can be found in sufficient quantity for collecting in this region. A search for the material would necessarily be made during the dry periods of the year.

"In an article on 'Douglas Fir Sugar,' by Professor J. Davidson, of the University of British Columbia, it is reported that the region in which sugar-bearing Douglas firs are most abundant lies between the 50th and 51st parallels and between 121°-122° longitude. This includes the driest and hottest part of the dry-belt of British Columbia."

A FOREST FIRE

THE following word picture of a forest fire appears in the report of the Ontario Game and Fisheries Commission. It is a graphic description of the mighty tragedy:

"To the average man, no doubt, the reading of the destruction of miles of standing forests conveys but little of its true significance. He can hardly appreciate the gigantic figures arrayed before him as to the square feet of timber burnt or the estimated value of the same in millions of dollars. He may perhaps be aghast at the loss of life or suffering and hardships endured by those who were fortunate enough to escape their flames. He may even dimly realize that these people have lost their homes, their possessions, their all. But the effects on nature are as a closed book to him. He has not seen; he cannot understand.

"The stately forest, stretching unbroken for miles, harbors countless wild animals, birds and insects. Life, indeed, is seething in it. The soil on which it stands is nursed and enriched by its fallen foliage and trees, which in many instances cover even the bare rocks sufficiently to allow of the seeds taking root right over them and which form always a natural basin where the raindrops may fall and accumulate, to percolate subsequently into the crevices of the rocks, from which again they will appear in the form of a gushing spring. Just as on the even outpouring of the spring will depend the flow of the brook, the stream and the river, so does the spring itself depend on the existence of its damp and mossy forest reservoir for its waters. The forest fire is capable of destroying all: animals, birds, insects, vegetation and soil. The voice of the forest is hushed, and the death of the trees is not only accompanied by the annihilation of one of nature's great water storages, so vital to the prosperity of some perhaps far distant agricultural community, but by the disappearance of an important factor in the regulation of both climate and rainfall over a considerable region.

"The picture of a forest destroyed by fire almost baffles description in its appalling horror. Unrelieved by the accustomed sounds, the cheerful note of songbirds, the chirruping of squirrels or chipmunks, the calls of animals or the humming of insects, deathly silence regins oppressive and supreme. Great trees and small trees alike, black, bare and gaunt, stand shivering as the breeze soughs a mournful dirge through their ranks, ghastly skeletons of nature's once beautiful handiwork, or else lie prostrate on the ground, charred, burnt and shrivelled, grim spectres of a useful past, proclaiming the passage of ruthless death, the advent of desolation and decay. No butterfly or moth flutters over the withered and blackened leaves; no little creature or insect crawls from among them, startled by the approaching footfalls. Far down into the accumulation of twigs and decaying vegetation which has formed the forest bed, into the mossy and spongy soil which in the past has held water to furnish life to the trees growing on it, the relentless fire has eaten its way and left its train a mass of useless cinders from which all nutriment has been utterly scorched. The human visitor to this tragic scene will have himself alone for company; will hear his own breathing; will be conscious of his own heartbeats; will be almost terrified at the sounds of his own footsteps; for life has been extinguished, the silence of the grave will surround him, and it will seem almost sacrilege to break the all pervading quiet of the dead. In due course the action of the winds will blow away the cinders, and the bare rocks over which once grew the forest will be exposed to view in all their unbeautiful and grim nakedness, and the region will remain barren and in all probability useless to man's welfare until, perhaps, after the lapse of centuries nature once again shall have succeeded with indomitable patience in recovering the rocks with a fresh soil."

THE WINTER ASPECT OF TREES

BY R. N. DAVIS

CURATOR OF EVERHART MUSEUM, SCRANTON, PENNSYLAVNIA

ASIDE from occasional displays of the winter beauty of forests we are apt to think of trees in winter as dead and uninteresting. While it is true that the trees usually lack leaves, fruits and flowers during the winter season some of their other characters stand out more prominently at this time. In winter we can see the form of the tree and its method of branching much more clearly than when it is clothed with leaves. The color



A STUDY IN BRANCHING

The white ash on the left has opposite branches. A ring around the stem just above the upper pair of branches marks the beginning of the year's growth. All the ashes and maples have opposite branches. The witch-hazel, shown on the left, has the two-ranked alternate arrangement of leaves, buds and branches. In this spray only one of the lateral buds of 1917 developed into a branch in 1918, all the buds below it remaining dormant.

and surface markings of the bark, too, stand out more distinctly in winter. An expert can tell almost any species of tree by an examination of the bark. The winter buds make an added feature of intense interest. What a wonderful difference there is in these embryo branches! The great buds of the horse-chestnut have a most elaborate arrangement for the protection of the delicate parts within. The baby flower cluster is covered by the downy growth of the undeveloped leaves. The latter are surrounded by the tough hard scales and these are varnished over to keep out the water. We can find all gradations from this most elaborate protective covering to those in which there seems to be but the slightest attempt at protection from the rigors of winter.

In northeastern Pennsylvania are nearly a hundred species of native forest trees. Probably very few equal areas have a greater wealth of species. Learning to recognize nearly all of these trees by sight at any time of year is not a task but a great pleasure. If considered by groups it simplifies matters greatly. First of all consider the cone bearing trees. No one could have any difficulty in distinguishing these trees from all others. If we made the group of evergreen trees it would include almost the same species. The only native coniferous tree here which sheds all its leaves in autumn is the tamarack or American larch. The European larch is occasionally planted but can be distinguished from native species by its larger cones. In the far west there are two other species of larch. From Virginia southward the bald cypress is found in great abundance and this tree has received its name from the fact that it is bare of leaves in winter. With these few exceptions all our coniferous trees are evergreen. Of our broad leaved trees none are evergreen in this vicinity although there are some such species in the south and we have a number of shrubs which are evergreen.

In the immediate vicinity of Scranton we have but two



A SUGAR MAPLE GROWN IN THE OPEN

The form of the top of the sugar maple is unmistakable even at a great distance.

pines, the white pine and the pitch pine. We do not have to go more than twenty miles to the south, however, to find occasional specimens of the scrub pine and a somewhat longer journey to the north will reveal the

red pine as a forest tree. Our native pines of northeastern Pennsylvania may very readily be distinguished by their leaves alone. The white pine has very slender needles with five in a bundle. The pitch pine has three in each bundle while the other two species have only two leaves. These latter can be distinguished from one another by the long leaves of the red pine and the short ones of the scrub pine. In other parts of our country where a different grouping of species occurs a somewhat different way of distinguishing them may be used.



THE AMERICAN ELM

The magnificent elm is the pride of many cities. It is one of the best of trees for shade and ornament.

The coniferous trees present much the same aspect in winter as in summer so let us turn to the deciduous trees, the ones which present such great contrasts in the two seasons. The arrangement of the buds and branches of these trees is what we should note in arranging them into groups. Buds form in the axils of leaves and so their arrangement is the same as that of the leaves. Trees have a definite plan in the placing of the leaves—just as definite as the carpenter's plan in arranging the shingles on a house. The shingles are placed so they will catch all the rain. Leaves are placed so they will catch the sunbeams and trees have different ways of arranging their leaves so they will do this work effectively. The catalpa tree has a way all its own. It places three leaves in a whorl and then at a little distance above there is another whorl so placed that the leaves will cover the spaces between the leaves below. In winter we cannot see these leaves but the leaf scars show where they were and the buds just above add certainty to their location. If we find a tree with the buds arranged in this way on the vigorous shoots we may be assured it is one of the two species of catalpa.

The opposite arrangement of leaves, buds and branches is much more prevalent. All our maples and ashes have this characteristic. Horse-chestnut and the buckeyes also have the opposite arrangement although it is less apparent on account of the suppression of many of the buds by the deep shade. As this group of trees is rather small it is easy to distinguish the various species by other characters, especially by the appearance of the buds themselves and by the peculiarities of the bark. For instance, the red maple can be distinguished from all other maples by the reddish twigs, the whitish gray bark of the limbs and trunk until the latter reaches nearly a foot in diameter when it takes on a rough surface and becomes dark colored. The striped maple can be told at a glance by the green and white stripes upon the bark which give the name to it.



THE YELLOW BIRCH

The bronze bark of the yellow birch distinguishes it from all our other trees.

The hard or sugar maple is by far the most important of all the maples. The lumber is valuable for many purposes but the unique thing about the tree is the abundance of sweet sap which it furnishes. While all the maples have sweet sap none of the others are so important as sugar producers. This was appreciated in early times and a century and a quarter ago when the real estate men of that time were attempting to lure New

England men to these Pennsylvania lands "out west" they put on their map in big letters "The Sugar Tree Grows Here." Of course the manufacture of sugar from beet roots had not then developed and its manufacture from sugar cane was far less extensive that it is at present. A sugar tree was certainly some inducement and recently, during our war-time restrictions, one could ardently wish for a tree from which he could gather sugar.

The sugar maple makes one of the very best shade and ornamental trees. A row of these trees along a country road gives comfort to the traveler and beauty to the landscape. Even in winter one of these open grown trees can be distinguished at a great distance by the outline of the top and the way the branches radiate.

The white maple is planted extensively as a shade tree since it is easy to start and grows rapidly. Its natural habitat is usually along streams but it readily grows when planted in other situations. It is the earliest of all the maples to bloom and the blossom buds in



THE RED BIRCH

This tree sometimes grows in clumps as shown in this picture. The most prominent characteristic, however, is the salmon colored bark composed of very thin loose layers. As the trunk gets larger it loses this peculiarity and becomes much like the bark of the black birch.

mid-winter will distinguish this tree from all its relatives since they are so much larger. Another characteristic that will serve to identify it is the upward turn to the twigs.

By far the largest group of trees is made up of those which bear but one leaf at a given level on the stem. Some of these, as the witch-hazel and the elm, have the second leaf half way around the stem from the first one and consequently there is a two ranked arrangement of the leaves and the resulting buds and branches. One does not need to make a close examination of the elm in order to recognize it. As far as one can see the gracefully arching branches proclaim this tree which Micheaux called "the most magnificent vegetable of the temperate zone." We may not agree with him in this rather extravagant praise yet there is probably no other tree so



THE WHITE BIRCH

Notice the black triangular patch at the base of each branch of the white birch. The habit of growing in clumps is well illustratd here.

generally planted in America for shade and ornament.

It may be well to observe here that most of the trees having but one leaf at a given level have each succeeding leaf two-fifths of the distance around the stem from its predecessor. In the elm with the second leaf half way around the stem from the first we can see that the leaves and the resultant buds form two rows or ranks along the stem. In the maple and ashes with their opposite leaves and buds the second pair is set at right angles to the first so that we have four ranks to the leaves, buds and branches. In the numerous trees where each succeeding leaf is two-fifths of the way around the stem we can readily see that there must be five ranks of leaves. Finally, in the catalpas with the whorl of three leaves and the next whorl set to cover the joints in the first there must be six ranks. Of course, one must examine a quick growing shoot that is fully exposed to the light and air on all sides to see these plans fully worked out. Usually by the suppression of leaves by shade of neighboring parts or by the twisting of the stem

it is somewhat difficult to determine the plan in the arrangement of leaves, buds and branches.

The birches form an interesting natural group of trees. In winter the cylindrical bud that is destined to develop into the catkin of staminate flowers is quite noticeable. The pistillate bud is not so prominent but may be found by a little searching. The birches can be distinguished from one another by the appearance of the bark alone.



THE WHITE OAK

The bark of the white oak clearly distinguishes it from all its relatives.

The most common of these trees is the black birch, so called on account of the stem being darker colored than that of any of the other species.

The yellowish bronze color gives the name to the yellow birch while the white color of the bark gives the name to another common species. This white birch is especially abundant in burned-over areas, the small seeds being carried to a considerable distance by the wind. The European white birch is a closely related species frequently planted about town as an ornament. The pendent twigs of this species and the less prominent triangular black spot at the base of each limb will distinguish this European species from our native white birch.

Northeastern Pennsylvania is about the northern limit of the red or river birch. This is essentially a southern tree but along our streams it grows in considerable abundance. The freedom with which the outer bark peels off in layers together with its reddish color will distinguish this tree from any other. We are just at the southern limit of another noted birch tree, the paper or canoe birch. It is only along the northern slopes of our mountains that this tree can find a congenial home. Farther north it forms an important part of the forest. Paper birch wood is devoted to several unique uses. Almost every spool for sewing thread is made of paper birch. Nearly all wooden toothpicks are made from it. Formerly it was used to make shoe pegs so that while it was then under everybody's foot now it is in everybody's mouth. It was the bark of this species that the Indians used to make their light canoes. Of the ten known species of birch in North America these five are probably the most important.

The oaks form another important group of trees in our region. All oaks agree in bearing acorns but in winter this is not always apparent for some species mature the fruit in one year and it falls to the ground. Others have the slightly developed acorns on the branches in winter and these come to maturity in the following summer. The barks of the various oaks present some interesting contrasts. The light colored and slightly



THE CHESTNUT OAK

The deep fissures and high ridges of the bark of the chestnut oak are remarkable.

roughened bark of the white oak is very different from the bark of the chestnut oak with its high ridges and deep fissures.

One of our most interesting and most valuable forest trees is the tulip tree. In summer we could distinguish this fine tree from any other species by the form of the leaves. They seem to be cut off at the apex at right angles to the midrib. The large greenish yellow flowers also distinguish this tree from all others. In winter the tall straight trunk suggests the species and if we can get a view of the winter buds we can perhaps dissect them enough to identify the peculiar form of the unde-

veloped leaves. This tree furnishes the valuable lumber known among builders as "whitewood," "poplar," or "yellow poplar." It is one of the most satisfactory shade and ornamental trees.

An interesting study of trees is to trace the annual growth by the rings left on the branches by the bud scales. On red maples growing slowly I have been able to trace back the growth from year to year for a full decade. For preliminary practice in this amusement it is well to take limbs that have been cut off in pruning operations and after one has counted the age of a branch by observing the rings on the bark he can cut across the limb and count the annual wood layers. Of course, the two results should agree. As the growth of the tree continues the swelling bark obliterates the rings made by the bud scales and one cannot usually trace the growth for more than four or five years although there may be cases where the segments can be identified for a dozen years.



THE PAPER BIRCH

The outer bark of this birch is used for canoes. This was the best material the Indians counld find for this purpose. It is a beautiful tree and when mixed with other forest trees the contrast is striking.



BEECH

Although the beech is not valued as a lumber tree the smooth gray bark lends a charm to the tree as it stands in the forest.

INTERCOLLEGIATE ASSOCIATION OF FORESTRY CLUBS MEETS

AT the Yale School of Forestry, New Haven, Connecticut, on February 26-27, the fourth annual convention of the Intercollegiate Association of Forestry Clubs will be held. Delegates from the various forestry schools will be present and also it is planned to have a large number of prominent practicing foresters and lumbermen address the meeting.

Great emphasis will be placed at the meeting on the discussion of forest education and forest policy.

The Association was founded at Cornell University in 1914 and conventions have been held at that university, the University of Michigan and the University of Washington.

At present practically all the forestry clubs of the various universities teaching forestry are members of the Association. All interested are invited to attend the meeting.

TICKS AND TIMBER

BY AUSTIN CARY

IN CHARGE, CO-OPERATION WITH PRIVATE TIMBERLAND OWNERS, UNITED STATES FOREST SERVICE

THE South has not figured largely in the calculations of foresters. In fact, as compared with the Northeast, which is much farther advanced commercially, and with the West, where the National Forests are located, it has received but scant attention. It is, however, a land of great interest and promise.

The vast extent to which good land in the South is still unutilized has been lately brought to public attention through the movement for soldier's homes. Most people, probably, have lately acquired some sense of a new industrial life now stirring through that region. This new activity is along two main lines — manufactures of various kinds, and new uses for land.



ABOVE: THE GOOD AND THE POOR IN CLOSE PROXIMITY. 17 YEAR OLD SLASH PINES UP TO 8 INCHES IN DIAMETER AND 45 FEET TALL; PROMISING TO YIELD 15 YEARS FROM NOW TEN TIMES AS MUCH NAVAL STORES AND LUMBER AS THE OTHER SITE.

BELOW: THE TREES, THOUGH PROBABLY 150 YEARS OLD, ARE ONLY 50 FEET TALL, AND THE STAND 1200 FEET PER ACRE. SOIL MAKES THE DIFFERENCE.



Men are discovering that southern lands have resources not previously valued, and that proper treatment may develop these to a usefulness never before dreamed of. At one point and another, and in one direction and another, therefore, thought and enterprise are now reaching out for the utilization of opportunities. This movement is in its inception as yet, but under the pressure of economic forces and the steadily maintained push of American business men, it seems destined to make of the South "the next West," as some have expressed it. Of the new uses for land, grazing is today most prominent, and hundreds of enterprises are starting. Its large success depends on the extermination of the cattle tick, a long-standing pest of the South, which brings to naught all efforts to improve the strain of cattle, kills many of the animals, and stunts the growth of all. Eradication of the tick is essential for a successful grazing industry. Fortunately, the foundation of scientific investigation was laid years ago, the execution of plans has already made good progress, and within a few years success promises to be complete.

Great should be the reward of those who have led in that work at its different stages, for they have not only freed southern cattle of a tremendous handicap, but they have taken a load off the energies of a host of men. The new life and spirit of enterprise where that incubus is removed are noteworthy.

Not least, perhaps, of the results of this housecleaning, though not very strongly in evidence as yet, will be the effect on the forest interests of the region. These will gain with the new stimulation of thought; but there are special channels through which benefit will flow,

determined by the methods and economics, new and old, of the grazing industry. The contrast between new and old is great indeed. There had always been a southern cattle industry, but people in those sections of the country constituting the great markets had seldom heard of it. It was, in fact, a poor and shiftless thing. Cattle ran on the open range without selection or care, were bled and diseased by ticks, and weighed at maturity but 300 to 700 pounds. In the late winter of each year they came near the point of actual starvation. Such an industry did not produce the meat sought after in discriminating markets.



STARTING IN A DRAINED CYPRESS SWAMP. STILL WET, FIRE COULD NOT DESTROY SLASH PINE SEEDS AND SEEDLINGS. AFTER 25 YEARS THERE IS A STAND OF 60 CORDS PER ACRE.

In this method, too, a matter of great significance for forest growth was involved, for fire in a measure kept the ticks down, while, to secure in the starving season feed that was fresh and unmixed with the dry growth of the preceding year, fire again was useful. Thus, beginning in Florida in January, and working north through the pine belt in February and March, swept the annual fires. Most residents of the country owned cattle, and so were interested in the yearly burning. The nature of the cover was such that great, devastating conflagrations like those of Minnesota were not to be feared. For a long time, forests were so extensive and timber so abundant and cheap that results in that direction were hardly considered at all. Thus the custom of a people became established.

Times have changed now, or are changing, and in many fields. Agriculture is more intensive and scientific, for one thing, and demands release from the anxiety and damage it has suffered in the past. Growing timber is beginning to be considered, as the leaders in industry sound a warning about waning virgin supplies. Managers of the grazing industry have found out that, while fire might temporarily improve feed, valuable plants are thus driven out, and production is decreased in quality and volume. Above all, the improved stock, certain to be introduced as the tick is driven out, would not thrive on such treatment. Winter feeding, greatly improved pastures, a smaller area used for grazing because of that fact, promise to be the features of the new time; and, with that, the demand for fire will become less insistent, and its use finally be reduced to the occasional.

Thus does one thing affect another. As economic conditions change in one field, an influence, frequently of great power for good, beginning there, spreads through other areas. However, these questions remain: how much will the South gain in respect to its timber resources? What has she to start with now, or what will spring up anew, as a result of this changed relationship.

A candid answer admits that there is great local variation, but claims that, on the whole, a very great gain may be expected. When we think of the tremendous area involved (a writer has lately noted that the Gulf States alone exceed Germany, Holland, Great Britain, Japan and Formosa taken together) any gain that is general in this section becomes of moment to the whole nation. Added to the vastness of the area, are natural



DESTRUCTIVE TURPENTINING. TREE TRUNKS CUT INTO DEEPLY BY "FACES" OPPOSITE ONE ANOTHER HAVE BROKEN OFF.

conditions of great potency—a variety of serviceable and strongly reproducing trees, a long growing season, and soils that are fresh and unimpaired. Great contrasts are found, however, and these contrasts are not seldom exhibited within small spaces. Soil conditions are all-important. Texture, relation to clay or hardpan, depth of the water table, content of lime—these things, in their different degrees and combinations, affect vegetation to a marvelous degree. They mark off different types by sharp lines; they decrease or increase vastly the rate of wood production. This condition, for the man contemplating enterprise, in timber or another line, constitutes both challenge and opportunity. Of this diversity, no part of the South is more illustrative than Florida. The rich and the poor lands frequently lie side by side, with enormous differences in productivity. Some of these differences, together with a partial understanding of phenomena in a broad way (no tropical features are, however, included) may be gathered from the photographs.



TWENTY THOUSAND FEET PER ACRE OF LONGLEAF PINE TIMBER DESTROYED BY TURPENTINING AND THE FOLLOWING FIRES.

PAPER FAMINE IF FORESTS ARE WASTED

IN less than 20 years 95 per cent of the pulp and paper mills of the country, mainly those in the East, will have practically exhausted their supplies of spruce, hemlock and fir—the principal woods from which the paper on which newspapers are printed is made.

The annual cutting of these woods in the New England States and New York is approximately 3,262,000 cords, and at this rate the supply will last approximately 17 years. The estimated annual cutting in the Lake States is 3,030,000 cords, and if continued will exhaust the supply in that region within 18 years. Pennsylvania, Maryland, Virginia, and North Carolina, with their smaller forest resources, are even worse off, the annual cutting being calculated at 1,470,000 cords, at which rate the spruce, hemlock and fir will last but ten years. Only in Alaska, Washington, Oregon and California are the reserves in no immediate danger of exhaustion if the cutting continues at the present rate of 2,218,000 cords a year.

These figures, of special interest because of the present paper shortage, are included in estimates compiled by the Forest Service of the United States Department of Agriculture. The data accumulated gives additional emphasis to the demand for a nation-wide policy that will put privately owned forests on a permanently productive basis and will also result in utilizing mill waste for paper making.

Even if the country's hemlock, spruce and fir resources, including the vast forests of far-off Alaska, are lumped together, the supply of these woods will be sufficient to meet the lumber and paper demands for less than three-fourths of a century, assuming that the present rate of cutting continues. At first glance it might seem that a national supply for three-fourths of a century makes it unnecessary to worry over the lumber question for some time. But, as already stated, 95 per cent of the pulp and paper mills are located in the East; these are very expensive establishments, often costing millions of dollars, and can not be moved conveniently to new locations, nor can wood be shipped to them economically from great distances. Consequently talk of easily utilizing the far-off reserves is impracticable unless the present mills are to be scrapped and new ones built nearer the source of supply.

Up to ten years ago the United States was self-supporting with regard to newsprint, but within the last decade the consumption has exceeded home production and promises to do so increasingly. In view of this situation two alternatives present themselves, according to Forest Service experts and representatives of large wood-using industries. The country must depend increasingly upon Canada, eventually abandoning many of its own mills, or the nation's policy with regard to its private forests must be radically changed. Canada now has 90 paper and

pulp mills which produce approximately 2,100 tons of paper a day, of which 89 per cent is available for export. Of all supplies of paper, wood and pulp used by the United States about one-third now comes from Canada.

While the supplies of pulp wood in Alaska and the Northwest are very great, only about five per cent of the mills are located in those regions. So long as publishers can obtain Canadian paper more cheaply than they can get it from the West, it is to be expected that they will buy from Canada. Nevertheless, there are several factors which should gradually bring western paper into competition with the eastern Canadian product, according to forest experts. There are quantities of wood in the West available at stumpage prices much less than in the Northeast. Much of this wood is on the National Forests, and, therefore, is available without the carrying charges that must be figured against large investments in land. Furthermore, the yield per acre of forests is much greater in the West than in the eastern Canadian forests, and there are large water powers available in the West. Certain disadvantages, such as high wages and high freight charges, must be recognized in considering the supplies in the West, but it is believed that these do not counteract the advantages.

The Forest Service points out, however, that whether paper interests rely upon Canada, or upon increased use of our western resources, in either case these are temporary expedients. In the long run the country must solve the paper problem on the basis of a *permanent* wood supply. To this end it is urged that mill waste be utilized for paper making and that the forests of this country be regenerated and administered on a more productive basis.

Mill waste, including slabs and edgings, is well dapted for paper making by one of the three chemical processes now commonly employed. But only about three per cent of the wood used for pulp is mill waste, and this is evidently a very small portion of all the slabs and edgings from spruce, fir and hemlock now being made into lumber. Here, undoubtedly, is a big field for development, as it is estimated that there must be an annual waste of 1,600,000 cords of these species alone.

Even more important than the utilization of mill waste is the regeneration of the forests for the perpetuation of the paper industry in the United States. The policy of wastefully cutting the forests and making little provision for future growth must be abandoned speedily, say forest experts. In the future, operations should be so conducted as to secure increasing reproduction of trees valuable for lumber and pulp. Fortunately such species as fir and poplar are prolific seeders and may be reproduced naturally. Spruce may be reproduced under proper methods of forest management, though with more difficulty. As the cost of pulp wood increases, investments in plantations, especially in the neighborhood of pulp mills, will commend themselves. The growing of large quantities of wood close to the mills will greatly reduce the cost of lumbering and transportation. Young, thrifty, growing forests will produce yields scarcely imagined by one who has been accustomed to deal exclusively with old timber. It is urgently recommended that in this connection the practice of Sweden be given serious consideration. In that country the mills employ technically trained foresters who prepare accurate figures concerning the yearly growth of the forests which serve as a rigid basis for the annual cut of timber.

It is the wood-using industries, rather than the lumber companies, that are especially interested in applying conservation to the national lumber supply, according to the Forest Service. Likewise, it is the publishers rather than the pulp companies which must eventually pay the penalty for wasteful lumbering and which must, therefore, take it upon themselves to guarantee the perpetuation of the nation's pulp supplies.

FORESTS IN JAPAN

"THE United States may well imitate Japan in the care with which it enforces its forest conservation laws," says a well-informed teacher much interested in forestry problems, who has recently returned from the Orient. "In Japan, all the wooded land is carefully guarded, practically every tree on the government forest land is listed and not one is allowed to be cut down except with express permission of the government, and then not unless another tree is at once planted in its place."

About four-sevenths of the forests of Japan are owned by the state. As is well known, Japan is not much of an agricultural country, its farms being very small and intensively cultivated, but the greater part of the country is occupied by mountains largely covered by forests. It has about 50,000,00 acres of forest land, including cedars, pines, cypresses and firs, with some oaks, maples, beeches, willows, etc. Few of the trees, however, attain a great size, and for large dimensions and long lengths of timber Japan imports wood from America.

One of the interesting and grotesque sights in Japanese parks and houseyards is the presence of many deformed trees—those twisted into human or animal shapes. Some of these deformed trees are very small, so that they may be placed on a windowledge, and for such bizarre plants the equivalent of perhaps two thousand dollars will be paid.

But little wood is used in Japan for dwellings, because they are usually simple in structure, have paper walls, doors of square lattice work covered with paper and such building makeshifts.

Much lumber is used in jinrikisha and match factories, of which there are many. Enormous numbers of matches are made each year, mostly for Oriental trade, this being one of Japan's principal industries. Her great shipbuilding yards require a large amount of lumber and her pretentious shipbuilding program for 1919 promises greatly to increase the demand for both native and imported lumber.

THE OPOSSUMS

BY DR. R. W. SHUFELDT, C. M. Z. S.

AT THE present time opossums may be found in suitable localities from New York to northern Florida, and as far westward as Texas; it is said that they seem to be extending their range somewhat to the northward. In scientific and in popular literature few American mammals have figured more frequently, its great rival being without question the racoon. 'Possum hunts have taken place all over the South ever since the country was settled, and the incidents which have occurred during these exciting times have furnished food for song and story since the days of the colonies.

Throughout the South 'possum is held in high esteem for its flesh, but more particularly by the negroes, and by them the animal is most persistently hunted. Being largely nocturnal in its habits, these stirring affairs usually take place at night, when a party is formed, the dogs mustered, and the hunters, armed with sticks and guided by torches and lanterns, start out, a merry party, for the forests known to be haunted by these cunning marauders. The barking dogs are employed to tree the 'possums, who, in their fright, will shin up anything from the weakest sapling to a big gum tree or pecan. In any event, either the victim must be shaken out, or one of the party must climb up and shove him out, and to this the irritated animal often seriously objects, snapping and growling at his assailant like a big rat—indeed, at such times he is not unlike one of them. However, sooner or later down he must come. As he strikes the ground he changes his tactics entirely, and immediately feigns death in a manner so perfect as often to deceive those familiar with this trait of the animal. However, in his present predicament this is of no avail, for one of the hunters quickly pins him down, back uppermost, by placing a stick across his neck, and holding him down dislocates his neck. Then, bagging the game, with a shout the party takes a fresh start, and the dogs search for another trail.



A FULL GROWN VIRGINIA OPOSSUM. ABOUT ONE-FOURTH THE SIZE OF LIFE. ANIMAL LOANED BY MR. EDWARD S. SCHMID, OF WASHINGTON, D. C. PHOTO FROM LIFE BY THE WRITER

Fig. 1. This cut gives an excellent idea of the appearance of the animal making his way on a small limb, also the expression of concern at having reached the end of it, with no chance of escape from his pursuers.

Mr. Ernest Harold Baynes, who has published some very entertaining chapters about opossums, said of the species that "speed he has none, his fastest gait being a sort of pacing movement which he can sometimes be forced into; but his cunning is so great that he can frequently give his enemies the slip. Sometimes he attempts to evade his pursuers by changing his direction, running back along his own trail, and thus throwing them off the scent. But his favorite trick consists of pretending he is dead—a ruse known the world over as 'possuming' or 'playing 'possum.' He does this so cleverly that many people to whom the trick was known have gone away and allowed him to escape under the impression that 'this time, at any rate, he really was dead.' No amount of physical pain can make him betray himself; and it sometimes seems impossible that any animal could submit to the torture he has at times been subjected to."

A number of years ago, the writer had a female opossum in captivity for a long time, and she gave him the opportunity of studying many of the habits of the animal. At the time she was taken she had nine young ones, each about the size of a rat one-third grown. On different occasions photographs were obtained of all of them, those of the mother not being particularly good, but successful in the case of the young. One of the latter illustrate the present article.

Speaking of the young, it is a well-known fact that the opossum is a wonderfully prolific animal, producing all the way from six to seventeen at a birth, and often—in the South—breeding as many as three times a year. The young are born at a very early stage of their development, and weigh but from three to four grains each, being quite hairless, and their eyes tightly closed. As fast as they appear, the mother shoves them into her marsupial pouch with her snout, where each quickly seizes onto a nipple; here they are nursed and grow with great rapidity. At the end of a week they are said to weigh thirty grains each; and by the time a month has passed, they occasionally climb in and out of the pouch, being at this time the cutest little creatures imaginable. In nature, an old opossum is known to take very good care of her litter; but for some reason they appear to be rather neglectful when in captivity.

Confirming what is said above, a writer at hand

remarks that, when they commence to venture forth, they "keep close to the mother, and hold on to her by their tails. Sometimes, with a dozen young ones the size of rats thus clinging to her legs, neck and body, and some of them dragging along on the ground, she may be seen going about in search of food. At this age these animals are pretty; they remain with the mother till



YOUNG OF THE VIRGINIA OPOSSUM, ONE OF A BROOD OWNED BY THE WRITER, AND PHOTOGRAPHED BY HIM FROM LIFE.

Fig. 2. Note that even at this tender age the end of the tail exhibits the foreshadowing of the ability of the animal to use it as an aid in climbing later on.

about two months old, then they learn to take care of themselves, but continue in the vicinity, seeming still to be under maternal guardianship in a certain degree." In the meantime, be it said, another litter may be produced—sometimes even a third. These, too, grow rapidly, and it is an interesting sight to see, later on, the prolific parent, surrounded by several representatives of all three of the broods, in her efforts to look after them properly, each according to its needs.

The opossum has a typically prehensile tail, a faculty that it chiefly brings into use during its life among the trees and in other places when on the ground. In climbing, it constantly uses its tail, swinging from one small limb to another, and it has the habit of suspending itself by the tail when feeding upon some fruit or other growing below its perch. Opossums, like the racoons, are very fond of grapes, and delight in regaling themselves upon persimmons when these are rich and ripe in the autumn, especially after the first frost. Moreover, they are partial to poultry, and will rob the hen-roosts with as much adroitness as a mink, or as that old adept in that calling—the skunk. In fact, the animal is in reality an all-around omnivorous mammal, and will, if hard pressed, also devour fish, mollusks, and various things on the bill-of-fare. It can also go for a considerable time deprived of both water and food.

So it will be seen that, with its marvelous tenacity of life, its prolific breeding, its extraordinary endurance under varying conditions of temperature, and its capacity to live and thrive upon anything eaten by any other creature under the sun, the opossum's chance to multiply and be a winner in the great struggle for existence are indeed excellent.

When winter comes, the opossum makes a nest for itself somewhere, either in the trunk of a hollow tree or in some similar situation, and passes the cold part of the year in a state of semi-torpidity. This hibernation, however, is never as profound as the one entered upon by the woodchuck, the bears, and other animals. In referring



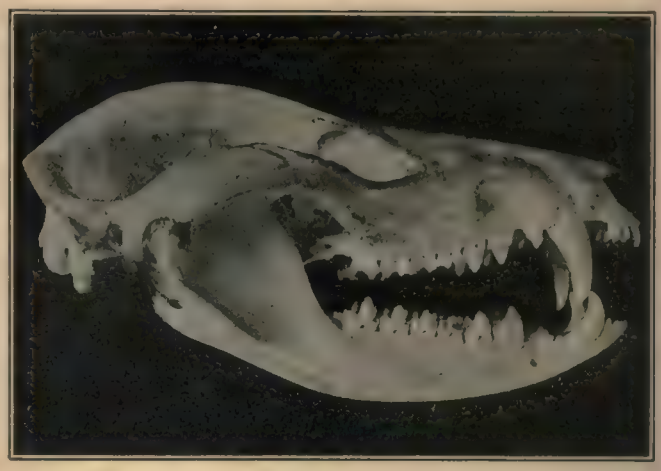
AN OPOSSUM AS HE APPEARS IN HIS OWN NATIVE WOODS IN THE WINTER TIME

Fig. 3. Through the courtesy of Mr. Ned Hollister, Superintendent of the National Zoological Park, where the specimen here shown belongs, the writer was given the opportunity to make this photograph within the precincts of that reservation.

to the footprints it leaves upon the snow, Baynes describes them in the following words: "Wherever the opossum occurs, its presence is indicated by its curious footprints on the ground, strange, uncanny footprints, which rivet the attention of every man who sees them for the first time, whether he is interested in natural history or not. They do not resemble the tracks of any other of our wild creatures; they look as though they might have been made by the hands and feet of some misshapen gnome or dwarf. They are most clearly seen upon the snow in the early winter; after that the animal sleeps part of its time in some snug retreat." In fact, the hand-like feet of the opossum will even attract the

attention of the tyro the first time a specimen of the animal is examined. And, in helping itself to food—be its nature what it may—it sometimes holds onto its resting-limb by means of its tail, while it employs these hand-like hind paws in manipulating the morsels it passes to its capacious maw. Being, as has been said, quite nocturnal in its habits, the opossum will spend most of the day curled up in some burrow, hollow log or stump, or even secreted in the dense foliage of some tree or other. Nevertheless, the old fellow will sometimes steal out in broad daylight—although more likely on a gray day—for a prowl about the woods, the orchard, or the hen-yard. On such occasions he will, in a sluggish way, climb among the limbs of trees; and should he spy some birds' nest, containing a clutch of dainty blue and speckled eggs, he will, without any compunction, swing himself down by the tail and deliberately rob the rightful owner of its treasures, picking them out, one at a time, and devouring them, still swinging by his handy tail, and suspended in midair. Sometimes he will surprise and capture some unhappy squirrel in its hole. Seizing his struggling victim, he will bite it in the back of its neck as quickly as he would a hapless chicken on its roost in the night-time ,devouring it with evident relish. Lizards and many insects meet with the same fate when he can capture them; and it is said that, when in a tight place and deprived of food for any length of time—perhaps facing starvation—he will, rather than succumb to such a fate, eat his own young, or even gnaw off his own tail and toes, making a meal of them.

Although often savage, cross, and snarly, the opossum nevertheless enjoys its playtimes. Two old fellows will frequently engage in a regular romp, rolling over each other, tugging away with their tails, yanking at each other's fur with all four paws, and biting each other in fun until the operation borders close upon no make-believe encounter. On a hot, sunny day, occasionally one will take a notion to stretch himself out on his back on a broad limb; with his tail hanging down, and his feet resting upon his nether parts, he will lie basking in the sun for an hour or more at a time.



SKULL OF AN OLD VIRGINIA OPOSSUM, SEEN ON RIGHT SIDE VIEW. PHOTO BY THE WRITER

Fig. 6. This cut well shows the formidable set of teeth possessed by this animal. Note how complicated the molars are, and that the canines resemble those of a small dog.

The old female opossum, which with her young the writer once had in his possession, fed sparingly upon raw flesh of various kinds, and would drink about a pint of milk in the course of twenty-four hours, her repast being generally indulged in at night. She did not appear to be very solicitous of her young, and made barely any resistance when one picked them up to examine them. Frequently she would roll partly up into a ball; then, when one of her young was taken from her, she simply gave vent to a kind of guttural hiss, accompanied by a sort of a grin. Shortly after coming into the writer's possession, she killed one of her brood —through carelessness, I believe —while one or two more fell into the drinking water or milk and were drowned. She did not seem to care very much, nor did she, apparently, make any attempt to rescue them. Her young, when fully as large as small rats, would nurse her many times a day, sometimes three or four of them attaching themselves to her teats at the same time, sprawling over each other, some being inside her pouch,



AN OLD OPOSSUM AT EVENTIDE. PHOTO BY THE WRITER

Fig. 5. One can easily imagine the behavior exhibited on the part of this shy old representative of his race, as he makes his way about in the long grass of the thicket in search of food.

some partly in it, and others having their heads just within the hairy margins of its entrance.

These young opossums were extremely difficult to photograph from the fact that they were so restless when taken away from their mother; they were not sprightly at all—simply sluggishly on the move; first gaping, then twitching their ears, or curling up their tails. Finally, when kept from the mother too long, they would commence to shiver all over.

If there be such a thing in nature as "a chip of the old block," then we must assuredly find it in the young opossum—any one of these little fellows was the veriest "chip" alive of its sleepy, old parent. It would walk along a twig just as the mother progressed upon a larger branch, holding on in the same curious manner with its hand-like feet. While thus engaged, its little prehensile tail also came into use; it would curl the delicate end of it about a twig in a gingerly way—with evident infantile misgivings as to whether it could be relied upon in case its tiny feet became exhausted. During the daytime they were continually gaping, making the most ludicrous faces while doing so, and exciting to laughter all that beheld them.

At this age their marsupial pouches are quite rudimentary, but still perfectly evident, while the bushy extension of the hair at the root of the tail is distinctly seen. The hair of the body is long and coarse, being much shorter and finer upon the head, while it is sparse and extremely fine on the rather large, white ears. Long white hairs are produced from either side of the snout and from above either eye, the latter being round, large, black, and twinkling. The mouth has a capacious gape, and the entire face and snout are pointed as in the old one. By the use of the tail and feet, these young opossums are able to hang onto the coat of the mother; and when they all get into the hair of her back, they present a very odd and amusing picture, to say nothing of the enjoyment they exhibit—howbeit, it was shown in such a sleepy way.

Mr. A. Radclyffe Dugmore gives an account of two of these animals that enjoyed a friendly ramble about the barnyard of a farm during a gray day, when the farmer and others had gone to the polls to vote, and there were none about to interrupt their investigations. The animals are designated as 'Possum One and 'Possum Two, and the sequel goes to show that in reality they were not altogether as safe from interruptions as they thought themselves to be, when they first sallied forth to enjoy their sociable raid, for presently one of the farm-hands came walking down the pathway. "At this moment the 'possums made another mistake, for the man would probably have passed them unnoticed had they not snarled and thereby attracted his attention.

"Now it happened that the man was not an American, and in that accidental fact lay the 'possums' one chance for escape. An American farm-hand would have picked up a fence-rail and with it promptly ended the lives of the 'darn little varmints,' who, even though they were thieves, stole only that they might live. But the man was an Irishman, fresh from St. Patrick's Isle. He had never seen a 'possum, nor did he know anything of their peculiar ways. Only the week before he had



A PAIR OF VIRGINIA EXPERTS AT THEIR OLD GAME OF "PLAYING 'POSSUM." PHOTO FROM LIFE BY MR. RADCLYFFE DUGMORE. COURTESY OF DOUBLEDAY PAGE AND COMPANY.

Fig. 7. The animal to the left has the appearance of being as dead as dead can be, while its companion is taking a peep to ascertain whether his ruse is going to save him from his fate.

been engaged as a farm-hand, and had been left on the place while the farmer and his sons had gone to the polls to vote, for the day was election day—hence the quietness of the farm which had inveigled our two marsupials from their retreats.

"Now when Dennis O'Connor saw the two strange beasts, his surprise was very great, and after uttering a few remarks that are best left out of print—for after all they have nothing to do with the story—he turned, brave man though he was, and made straight for the house. He remembered having noticed a gun standing against the wall near the chimney-corner. With such a weapon he feared no animal under the size of a dog, and he hurried out to do battle against the small silver-haired animals. These same animals had been making the most of their time. No sooner was Dennis out of their sight than they scurried along as fast as their short legs could carry them to the apple orchard. Once there, each proceeded to climb an apple tree. 'Possum One, in his hurry, selected a tree so small that it afforded him no hiding place, so he must perforce come down again, and that he did in the quickest possible time, clinging to the tree with his naked, prehensile tail, as he partly slid, partly climbed down. Once on the ground, he made directly for the nearest tree, which chanced to be the one that 'Possum Two had chosen. Here was still another to add to the growing list of mistakes; and, like the proverbial drop that overflowed the equally proverbial bucket, it proved the undoing of their otherwise successful retreat.



AN OLD VIRGINIA OPOSSUM AND HER SIX YOUNG ONES. PHOTO FROM LIFE BY ERNEST HAROLD BAYNES

Fig. 8. Any one of these young ones is somewhat older than the specimen shown in Figure 2; it is not altogether an easy matter to pack them about—hence the expression of responsibility on their mother's face.

"One 'possum might hide in an apple tree and remain undiscovered because of his color, which matches the silver-gray bark of the tree very closely; but two 'possums could scarcely hope to find places of concealment in the same tree. He heard the scratching sounds of 'Possum One as he climbed the tree. Nearer and nearer he came, until his nose was visible over the edge of the large knob. What might have happened is not known. 'Possum Two's vigorous protest against his friend's arrival was cut short by a loud report and a scattering of small pieces of bark where the shot had struck the tree just above the 'possums' heads. Scarcely had the echoes of the report died away, when Dennis saw two 'possums fall to the ground, and he congratulated himself on the 'foine shot' he had made, marching forthwith up to the seemingly dead animals. 'Shure but they're dead as nails,' he exclaimed, as he picked up one in a most gingerly way, quickly dropping it again. Yet there was no blood visible; but in his excitement he had not noticed a detail so trivial. Enough for him that the two animals were dead, and he himself was responsible for their slaughter; and he turned to lay down the gun that he might light his pipe preparatory to carrying the animals to the house. As he stood still, trying to light his short clay pipe, his back was towards the 'possums. Everything was so quiet that 'Possum Two decided to have a look, and, without changing his position, he opened his small, dark eyes, closing them instantly when he discovered the broad back of his enemy between him and the sky.

"It was a close shave, for at that very moment Dennis, his pipe lighted, picked up the gun, and, catching hold of the two 'possums by their rat-like tails, took his way to the house. Once there, he threw the two 'dead' animals on the steps, and, leaving them, he turned and walked toward the gate, for he heard sounds of the farmer returning. Round a bend in the lane came a two-seated buckboard, mud-bespattered and rickety, and in it sat the farmer and his boys. Dennis O'Connor, all excitement and pride, rushed up to them and told the

family all about 'the two queer bastes Oi hev kilt,' adding quickly that he had killed 'thim both wid the one shot from the fowlin'-pace.' On being asked what he had done with his game, he pointed exultingly to the clean, bare steps, but—

"It was many months before Dennis could be persuaded to give up his belief that some one had stolen his 'possums. He never saw them again, and the story of 'playing 'possum' is, and always will be, a sore point with Dennis O'Connor."

During certain seasons of the year, opossums are often exposed in the market for sale; but the writer is inclined to believe that the majority of them are purchased by negroes, as they are very fond of them.

There are quite a large number of different species of opossums found in various parts of South America, and all have very interesting habits. One little species is no bigger than a mouse; has no pouch, and carries her tiny young on her back, with their little mouse-like, though prehensile tails twined about her own tail for support. A number of years ago, the writer heard of a bunch of bananas bought in the markets of Cincinnati; when its owner came to cut them off, a male of one of these diminutive opossums was found curled snugly in one of the open spaces separating the fruit near the main stalk inside. This specimen was later sent to the Cincinnati Zoological Gardens.

The fossil bones of opossums found in the bone caves of Brazil belonged to types of didelphian species, either identical with or closely allied to those forms now existing in the same country. The writer never speaks of fossil opossums that it does not bring to mind the anecdote of the great French savant Cuvier and his celebrated examination of one of them. The story is especially well calculated to illustrate the methods by means of which zoologists and palæontologists restore the skeletons of long extinct mammals from the discovery of a few bones belonging to any one of them. Many people —though fortunately not anything like as many as there were—claim that such restorations were purely a matter of guesswork on the part of the scientists, and that it was impossible to know what the skeleton or probable form of the animal was like, where not only it, but all of its kind, had been extinct for many thousand, or even for several millions of years.

But the story of the sagacious Cuvier shed considerable light upon cases of this character. He had on one occasion received a split slab of stone from the celebrated quarries of Montmartre, in France. In these two halves were contained the fossil bones of the best part of a skeleton of some small mammal or other, of which, however, only the lower jaw and some of the teeth were exposed. These Cuvier closely examined, and came to the conclusion that the animal was a fossil opossum, closely related to existing species of that group. He further announced that when the workmen in the laboratory came to clear the skeleton of the matrix of stone in which it was encased, they would find that the animal possessed the marsupial bones of all the opossums. This part of his prophecy was subsequently fully confirmed; although when he made it, the aforesaid marsupial bones were completely out of view and sealed up in the solid rock containing them. Mr. Huxley, in his *Science and Culture and other Essays,* gave us some admirable deductions drawn from this very case that any one may read with profit, especially one who delights, not only in the triumphs of science, but in a brief lecture upon the methods employed in scientific reasoning.

During all the early history of this country, zoologists recognized but one species of opossum as belonging to its fauna, this being the well known Common or American Opossum. It was first described by Linnæus in 1759, and it was fully forty or more years after this before any other species of United States opossums were described.

FORESTRY IN GREAT BRITAIN

THE Earl of Selborne accepted the vice-presidency of the Royal English Arboricultural Society, Major G. L. Courthope announced, when presiding at the quarterly meeting of the council of the society, held at 16 Bedford Square, London. Proceeding, Major Courthope said he thought that on the whole the society might feel satisfied with the personnel of the forest authority. He was glad to say that the spirit which the members of the authority were displaying was very friendly to the society and to private enterprise in general. He hoped that this feeling would be continued, and that the results would be good. He understood that the authority was prepared almost immediately to make an announcement as to the various forms of assistance to private enterprise which it was prepared, with the approval of the treasury, to give.

Mr. Leslie Wood said he thought the various bodies interested might send a scheme for the government to criticize rather than wait for the government to get one out, cut and dried. The subject had been discussed by the forestry committee of the Land Agents Society, and he had prepared such a scheme which, he thought, might be brought to the notice of the English Forestry Association and the Surveyors Institution.

Mr. Duchesne announced that the British Empire Timber Exhibition would be held in London in 1920. It was being promoted by the overseas department of the Board of Trade, and would probably be held early in July, at the Holland Park Skating Rink. The object was to encourage the use of timber grown within the empire rather than supplies from the Baltic or other countries.

The president said he thought an effort should be made on behalf of the home-grown timber trade to see that it was well represented at the Empire Timber Exhibition, at least as well represented as India, Canada, Australia, and other dominions.

THE annual meeting of the National Wholesale Lumber Dealers' Association will be held at Washington, D. C., on the 24th and 25th of March. Headquarters will be at the New Willard Hotel, and the sessions promise to be of unusual interest.



THE WEASEL CLUNG AROUND THE GREAT BIRD'S NECK, TEARING AT HIS SHOULDER WITH BLOOD-STAINED TEETH

MAMMY COTTONTAIL AND TROUBLE.

BY ALLEN CHAFFEE

AUTHOR OF

I. "THE ADVENTURES OF TWINKLY EYES," THE LITTLE BLACK BEAR

(WITH ILLUSTRATION BY PETER DA RU)

II. A FIGHT WITH THE HORNED OWL

MAMMY Cottontail, the little brown hare, watched breathlessly while the weasel ran along the interlacing branches, soundless as a shadow. The weasel's slender body ended in a tiny wedge-like face with ears laid back flat and eyes gleaming red with murder.

Mammy crouched trembling behind a tree-trunk, her round eyes all but starting from their sockets. For even as the weasel glided snake-like along the limb, he peered this way and that through the gathering twilight.—But the weasel was after the gray squirrel, who now faced him from his hole with teeth bared in an angry "Chir-r-r" sounding his warning.

The weasel, with a hiss, snapped his teeth into the squirrel's nose, while the squirrel, fighting for his life, clamped his long front teeth through the weasel's jaw. But the weasel was the larger, stronger animal.—What followed turned Mammy's heart sick within her.

The victor in the unequal contest did not even have the excuse of being hungry. He had killed merely for the love of sport. And the gray squirrel once stretched limp on the ground beneath, he left it lying untasted.—That kind of killing was new to Mammy Cottontail's experience. She knew that in a race with a weasel she would stand even less chance of escape than had the gray squirrel. Then her blood froze with the awfulest fear she had yet known!—The weasel had found her trail!

Yes, sir, Mammy's blood froze! She was too stiff to move! Though it was useless to run as to fight. But even as she crouched there, like a brown clod on the white snow, an amazing thing happened.

It was by now quite dark, and the stars were pricking through the curtain of the sky. From away up in the top of a scraggly fir tree, at this instant, came a long,weird cry.

"Wa-hoo! Wa-hoo! Whoo! Whoo! Whoo!"

It was Whoo Whoo, the great horned owl, his feathers now white like the snow. (For he was protectively colored, changing his coat from Bark-brown to white and back again every year). Mammy had one more foe to fear! Then—the owl swooped toward the weasel!

Yes, sir! Mammy Cottontail saw with amazement that one enemy was to be played off against the other. The great white owl was swooping straight toward the weasel, yellow claws bared for a grip in that writhing back, and beak clicking angrily at memory of some time when the snake-like one had killed the baby owls.

A fierce old warrior was Whoo Whoo, the horned owl. His body was as long as the weasel's and a great deal heavier. On silent wings the great bird dropped to the back of the white-furred little murderer, who was by now sniffing at Mammy's trail. Then the weasel turned to face his ancient enemy, with teeth bared in a hiss, all the fury of his recent hurt blazing in his eyes, his wounded jaw dripping red on the white of his chest.

There was a whirl of white,—ghost-like in the gray gloom,—then a wild mingling of clacks and hisses, and a great pair of silent wings rose till they hung above the tree tops. Their owner clung with beak and claws to a writhing, wriggling snake-like body in white fur. But the weasel also clung around the great bird's neck, tearing at his shoulder with blood-stained teeth, and clawing at the feathery sides with his four sharp sets of toe-nails

Mammy did not wait to see how the struggle ended, though as Jimmy Crow told her next day, the Horned Owl won, reaching at last to the weasel's heart with his great steel claws, and finally devouring him for supper, with much discarding of the white fur in pellets that he spat out on the ground below.

(Whenever you find little balls of fur lying under an old hollow tree, you may know that Whoo Whoo or one of his cousins lived up there. For they swallow their mice nearly whole. Then their stomachs roll the fur up into a marble ready to cast it forth the way it entered).

No, Mammy Cottontail did not wait to see which one of her foes got the worst of it. But the instant she saw her chance, she made off up-stream as fast as ever she could go, till she found a place where the river was frozen a little harder. And once more she crossed on the thin ice, and made for her home in the Old Apple Orchard. And for several weeks thereafter she was quite content with nibbling anything she counld find, bark and twigs and frozen grasses, without going more than a few jumps from home.

Then one night,—a mild one for that time of year, she caught a wonderful odor. It was the odor of cabbage that was being thrown out to the chickens at the Valley Farm. And so long had she fared on tasteless bark that she made up her mind to have a leaf of that cabbage. She knew it was a rash resolve, for there was Lop Ear, the Hound, and Tom, the Barn Cat, and the Hired Man who carried a gun. But the wind was blowing that luscious odor straight to her now, and she simply could not resist.

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BIRD VISITORS FROM THE NORTHLAND

BY A. BROOKER KLUGH

WHEN the days grow short, the nights long, and chilly winds sway the leafless branches most of our familiar birds forsake southern Canada and the northern States. But the land is not birdless by any means. Some species, such as our blythe little friend the chickadee, the nuthatches, and the woodpeckers, remain throughout the winter, and many avian visitors come down from the northland.

There is a charm about the study of these winter visitors—the charm of uncertainty, for they are very irregular in their movements. Some species are usually



AMERICAN CROSSBILL

common and remain with us for a considerable time, but may, in any winter be rare or present only for a brief period. Other species again may be common during one winter and then absent from that locality for several years.

They are rovers, one and all, rovers which descend from their homes in the north in search of food. For it is food they seek and not a milder climate. There is no danger of a bird freezing as long as it has sufficient fuel with which to keep the fires of life burning brightly. A bird is clad in the warmest and lightest of all clothing, in clothing, moreover, which can be regulated as to its warmth at will. The best non-conductor of heat is a dead-air space, and a bird can, by fluffing out its feathers, increase the number of dead-air spaces between its body and the outside air. Hence the "fat" appearance of birds in cold weather and their slimmer appearance in warm weather.

One of the most regular and commonest of our winter visitors is the snowflake. This species is about seven inches in length, and in winter plumage is largely white with light brown on the back and top of head and black central tail-feathers. It breeds on the arctic tundra and in the breeding season the males are entirely black and white and the females black and white with some brownish on the back. The snowflakes usually appear in large flocks and as they fly overhead they utter a musical trilling note. When the flock drops to earth the birds run about among the weed-stems which project above the snow and feed on the weed-seeds. Their favorite seeds are those of rag-weed and pig-weed, though the seeds of many other weeds are also eaten, and by thus destroying the seeds of noxious weeds the snowflake renders a decided service to the farmer.

Another bird which often appears in large flocks, though not with the regularity of the snowflake, is the redpoll, a species about five and a half inches in length, with a patch of red on the crown. While in flight the redpolls utter a chattering call interspersed with long-drawn "sque-e-e" notes. The redpolls feed in the open fields after the manner of the snowflakes. The summer



EVENING GROSBEAK

home of this species is in Labrador and round Hudson Bay, where it builds a compact nest of fine rootlets and grass, lined with feathers, and placed about two feet from the ground in a dwarf willow. In its winter migration the redpoll sometimes goes as far south as Virginia, Alabama, Kansas and Colorado.

The pine siskin is a little bird about five inches in length, flaxen-colored, and heavily streaked with dark brown above, and whitish, streaked with dark brown beneath. It is sometimes termed the "winter canary" on account of its similarity in notes, size and behavior to the American goldfinch or wild canary. This bird breeds in Labrador, Nova Scotia, New Brunswick, eastern Quebec and in the Rocky Mountain and Coast Range. It also occasionally breeds further south. The

pine siskin is a bird of the woods and feeds on seeds of such trees as the birch and alder. It is very irregular in its visits, sometimes occurring in immense flocks and again during some winters being entirely absent. When it visits a locality it usually remains much later than most of our winter birds, often into May and sometimes early June, and at these times the males break into a very musical little song.

Everyone knows the chipping sparrow, the familiar little chestnut-crowned bird of the dooryard and the vines. But in the winter chippy has departed for a sojourn in the Gulf States or Mexico, and in his stead we have his cousin the tree sparrow, which is a little larger than chippy and has a blackish spot in the middle of its breast. The summer home of the tree sparrow is in Labrador and in the region west of Hudson Bay. The tree sparrow is often abundant in shrubbery at the borders of fields, and feeds almost entirely on weed-seed. During the winter the tree sparrow utters a musical callnote and in the spring, just before the flocks leave for the north the males may be heard pouring forth a loud, clear and powerful song.

A bird which attracts attention whenever it appears is the pine grosbeak. In this species the adult male is red with brown wings and tail, and two white bars on the wings. The female is smoky gray with the top of the head and the rump tinged with orange, and the young male is also smoky gray with reddish on the head and rump. The bill is short and heavy—hence the name grosbeak. The adult male is not infrequently mistaken by superficial observers for a robin, and often reports of the very early arrival of "robins" are thus circulated in the press.

The pine grosbeak usually appears in small flocks consisting of two or three adult males and a dozen or so females and young, but occasionally flocks of from fifty to over a hundred are seen. These flocks as a rule remain in a locality for several days, feeding on the berries of the mountain ash, and nightshade, and on the buds of the maple and spruce. In some winters this species may be common in a given locality from November until April, as soon as one flock passes on its place being taken by fresh arrivals from the north. On the other hand it is often absent for several years in succession.

The pine grosbeak breeds in northern New Brunswick, Labrador, in the territory round Hudson Bay, and westward to Alaska. The nest is placed in a coniferous tree and is built of twigs and fine grass, the eggs being pale blue, spotted with lavendar, drab and sepia.

During the winter the pine grosbeak as a rule only utters its clear call note of three syllables, but when the flocks remain late in the spring the males may be heard singing a rich warbling song.

A much rarer visitor than the pine grosbeak is the evening grosbeak. This species has a very heavy bill and is needed "uncou' thick i' the neb" as the Scotchman said of it. The adult male is a very striking bird, being greenish yellow with a blackish crown, black wings and tail, and a large white patch on the wing. The females and young are brownish gray above and dingy yellow beneath, and lack the large wing-patch.

The evening grosbeak breeds in the northern Canadian Rockies, and in its winter migrations it comes south and east as far as Ohio, New York, and the New England States. These flights vary greatly as to extent and the numbers present. In some winters, as in 1915-16, large flights occur and extend over a wide territory, then often for many years the birds are not seen.

This species in the winter feeds on the seeds of the Manitoba maple, the berries of the mountain ash, and various buds, and its powerful bill enables it to crack even such hard objects as the stones of cherries.

The evening grosbeak, coming from uninhabited regions, has but little fear of man, and many people who do not usually pay much attention to birds are struck by the tameness of this species.

Very peculiar birds in several respects are the American crossbill and the white-winged crossbill. The structure of the bill is unique, the mandibles crossing each other and thus forming a very efficient implement for removing the seeds from between the closed scales of the cones of evergreens. There is no definite rule as to the manner in which the mandibles cross, the lower mandible may be to the right or to the left of the upper mandible, it is entirely a matter of chance. A second peculiarity is the irregularity in their breeding season, which may be at the end of January or which may be delayed until as late as August, and a third peculiarity is that they may breed in a certain locality during one season and then may not nest there again for some years.

In the American crossbill the adult male is red with black wings and tail, while the female and young are olive-green with yellow rump and underparts. This species breeds in Maine, New Brunswick and Nova Scotia and westward to Alaska. It is erratic in its winter distribution, and sometimes goes as far south as Georgia and Louisiana.

The adult male of the white-winged crossbill is rose-pink with black wings and tail; the female and young are olive-green with yellower rump and abdomen. Males, females and young all have two white wing-bars. This species nests in Labrador, Newfoundland, northern New England, northern Michigan, and west to Alaska, and in its winter migrations goes as far south as Virginia, Illinois and Nevada.

Both species feed mainly on the seeds of coniferous trees and while feeding they keep up a cheerful twittering chorus.

Other winter visitors from the north are the snowy owl, the northern shrike, a gray bird about the size of a robin with a hooked bill, and the Bohemian waxwing, a cinnamon-brown bird with a crest and a white bar on the wing.

NEW ORLEANS CHILDREN BUILD BIRD HOUSES



Photograph by courtesy of the New Orleans Item.

SOME OF THE SUCCESSFUL COMPETITORS

BLUE ribbons, as national recognition from the American Forestry Association for the best bird houses built in competition, were recently awarded New Orleans children by the "New Orleans Item." Even the girls, the Garcia sisters, shown in the upper right-hand corner, realizing that this is "a woman's age," contrived a neat looking structure. The top group shows M. L. Alexander, head of the state department of conservation, at the left, and Dr. William E. Scheppegrell, president of the Audubon Park Commission, at the right, carefully checking up points on the houses. The boy at the upper left, Howard Hamilton Tebault Harper, is the youngest bird house builder in New Orleans. He is five years old. His great great grandfather and the great great grandfather of Theodore Roosevelt were the same man. His grandmother, Mrs. C. Hamilton Tebault, is vice-president general of the National Society of the Daughters of the American Revolution.

PROTECTION OF BIRDS

BY JULIA FORCE

BIRDS, as a portion of the realm of natural history, have been so cruelly slaughtered and otherwise persecuted, that they are much less numerous now than a hundred years ago. Man, with little effort could and should assume a definite work of protection to lessen every form of destruction.

When heavy snows cover the ground and the seed supply for the time is unattainable, the birds should be fed. Grain scattered about farm buildings, crumb baskets, corn ears and bundles of grain hung in trees, will tide the suffering birds over such periods of strenuous weather. The same can be done for fatigued birds which meet with heavy rains and strong gales during migration. Upon reaching their destination, migrating birds are hungry, lean and exhausted; and without human assistance great numbers must die. This is especially true in northern latitudes if the birds meet a backward spring which retards insect growth. It is then the birds are most likely to come to the vicinity of houses. There they meet one of their worst enemies, the cat; and if they choose their nesting places near they must live in perpetual fear for their lives and that of their nestlings when hatched. Much destruction is worked by both stray or homeless cats and well-fed ones; and because there is a superstitious fear the killing of cats brings bad luck, birds are left to suffer from that source almost without exception. Another source of destruction has been the small boy with the gun. Without discrimination, he has gratified his hunting instinct and love of adventure. Nor has he limited his depredations to bird-shooting alone. Egg collecting and nest destroying attack him as a fever with the recurrence of spring. His acts of cruelty are most probably due to ignorance and thoughtlessness but they do not manifest more of it than does the woman of fashion. One of the grossest forms of cruelty to birds springs from the caprices of fashion. That ladies' hats may be adorned with feathers, thousands of old birds are slaughtered during the breeding season, which means death by starvation to the helpless young. It is claimed that the majority of feathers used for millinery purposes are taken from birds in the tropical forests, but it is a well-known fact that the feathers of our plainest songsters assume the brilliant colors of tropical plumage when passed through the dyeing pot. Water birds, especially along the shores of our country, are victims of greed. Egg hunters gather and place on the market for food, thousands of their eggs. That naturally diminishes the annual number of young hatched. We could soon end the practices of commercializing birds and their products as well as the small boys' hunting; and with slight individual effort preserve thousands of birds each year.



A ROBIN'S NEST ON THE GROUND

This robin chose to lay her eggs directly on the ground, under a small syringa bush in the garden, without even a little straw under them. Miss Alice Bingham, one of our members, sent in the picture because, she says, "I have never before seen a robin lay her eggs on the ground, nor has anyone to whom I have described the occurrence. The mother sat on the eggs devotedly but we saw no sign of the father, and at the end of a week the mother, too, disappeared. I'm afraid the neighbors cat, whom we had scared away several times, finally caught her. I believe the picture is sufficiently unusual to be of interest to other bird-lovers." And we agree with her.

Ignoring their biological classification, birds are conveniently divided into two classes, beneficial and harmful. While no birds are wholly beneficial, neither are there any totally harmful. They are all, therefore, worthy of man's protection to the extent that no kind becomes extinct nor accumulates to the degree that they become pests. Good examples of the useful sort are quail, robins, orioles, woodpeckers and most sparrows because they help keep insect life within supportable limits. Less beneficial birds are crows, blackbirds and English sparrows; so regarded because of their depredations upon grain wherever they find it. Hawks and owls are usually classed among harmful birds, because of their tendency to destroy poultry; but a study of their habits has proved

that with a few exceptions, these birds prefer small animals of the fields, such as rabbits and mice. So prejudice against them is slowly being overcome.

However, the protection of birds insures a return of two-fold value to the protectors. If for no other reason, most birds should be protected for the beauty, music and companionship which they offer the world.

To the agriculturist, be he farmer, truckman or fruit grower, the practical value of birds should be sufficient reason for his protection. Birds are known to eat quantities of destructive insects such as chinch bugs and beetles, and the larvae of same. Birds are attracted to fields, pastures and orchards if they are fed and unmolested; and they very soon lose their timidity at the approach of humans. Many birds will make their homes in birdhouses provided for them by man. City dwellers are not exempt from assuming a share of the protection of birds, for the trees and shrubbery about their houses, along the streets and in the parks suffer from the ravages of insects quite as much as rural vegetation.

Efficient state laws as a means of protection, have been slow in coming. When the study of agriculture as a science was introduced in this country about forty years ago it gradually exposed the relationship that exists between it and birds. Their food habits were discovered and their great value realized. Game birds were protected in the early part of the nineteenth century; but small birds were not given a legal standing until later. Every state now has bird laws, but they are not uniform the country over. The prohibition of Sunday shooting, and the requirements of gun licenses in almost all the states, have done much toward eliminating the wholesale destruction of birds; but proper laws must be based upon and supported by the opinion of an enlightened public. Laws in many states forbidding the trapping of songbirds for pets, are leaving many more to enjoy their free state. Without doubt, more effective results can be secured through dissemination of knowledge concerning birds. People can always be found who are glad to hear and read interesting facts about birds. To give everyone the opportunity, able writers and lecturers can be called upon to contribute to the press and lecture platform information on the relation of birds to man. Perhaps the public school can get more far-reaching results, by using a short period each week in systematic study of the birds of their localities, in observance of Bird Day and in organizing bird clubs. Teachers can make their efforts felt outside the schools through the children, by distributing government publications on the subject and by posting bird laws. This general instruction will not only give information on birds that are favorites, but will remove much prejudice concerning some of the less favored. There should be no doubt in the minds of clear thinking people that protection of birds in general affords increased pleasure of living.

The beauty of plumage gives pleasure to the eye trained to artistic appreciation; beauty of song cheers the unhappy and creates added pleasure for the happy; and birds in general furnish companionship for the lonely. For the farmer whose mind is necessarily concerned with crops and their financial returns, the protection of birds results in increased yield through the diminution of insect life. Increased yield means increased profits, and they in turn provide more efficient means for education, health and contentment, the combination of which spells happiness for the possessor.

THE OYSTER TREE

THE following good old story, published in the *Morning Courier and New York Enquirer for the County*, in its edition of November 20, 1829, has been sent in by Mr. Lott Van de Water, Jr., Secretary of the Agricultural Society of Mineola, L. I., N. Y.

"On a branch of the main river of Tomboz, in Peru, a singular appearance is presented by the oysters which line its banks. The reader has heard of that extraordinary tree in Numington, so large that a coach and horses can be driven with ease through its hollow trunk!—of that wide spreading oak of Nismes, said to cover an acre of ground!—as also of the far famed Upas, so baneful in its effects that instant death would attend the temerity of that traveller who should approach within five miles of it, and whose vicinage is covered with the dead bodies of the animals, reptiles, birds, and insects which have ventured within the sphere of its contagious influence! But has he ever heard of the oyster tree!—a tree on which *oysters* were the fruit?—Nay, start not gentle reader.—This branch of the main river that I have been speaking of is so lined with trees and underwood, as almost to exclude the rays of the sun. The branches of the trees, like the weeping willow, grow downward; at high water, the tide rising and falling six or seven feet every twelve hours, and overwhelming the low-lands, these branches become partly immersed. Thousands of oysters attached themselves to them, and at low tide they are seen suspended several feet above water, and present a curious spectacle. We plucked two boat loads of this species of marine *fruit*, which, though small, nearly equalled those of the Chesapeake."—*Voyage to South America in* 1823.

[A similar phenomenon may be witnessed on the Island of Jakel, situated in the mouth of the Alatamaha River in Georgia. The civil, or sour orange tree, abounds on the margin of the Island, the branches of which falling into the river, are acted upon in the same manner, as that of the tree above described; and what may be thought to add to the curiosity is, that the upright branches of the tree are frequently found abounding in their natural fruit, while those prostrate in the flood are supporting their marine adoption.]

INDIANA'S PRIZE WINNING FORESTRY ESSAYS

AS previously announced in AMERICAN FORESTRY, the 1920 contest for the best essay in forestry is on and will be open until May 15, 1920. A prize of five dollars has been offered by the State Division of Forestry for the best essay from the seventh and eighth grades, and a prize of $7.50 for the best essay from each of the high school classes. Interest and competition is already warm among the students. Following are excerpts from some of the prize-winning essays for 1919.



FOUR OF INDIANA'S FORESTRY ESSAY PRIZE WINNERS FOR 1919
Leland Williams, Jesse L. Baily, Alice Plane and Charles W. Hebbinghaus

The topic chosen was, "The Relation of Forests to National Defense," and Leland Williams, of Franklin, Indiana, writes, in part:

"There are three cardinal relations existing between forests and national defense. The fact that few people realize or recognize the importance of these relations, does not lessen that importance but only gives a reason for emphasizing it. The most important of these relations are those which exist between actual warfare and forests.

"The birch that is used in the manufacture of airplanes comes from the birch forests of the Northwest. The walnut that is used for gunstocks is furnished by forest trees. Trench, dugouts and other embankments are often supported by timber from trees. Gas-masks are important features in modern warfare. It is interesting to know that the nuts used in making masks come largely from forests.

"An effective means of transportation is essential to national defense in case of war. Railroads furnish one means of transportation. Millions of cross-ties are used in a railroad system. Wooden ships also play an important part as does the wooden box car. Barrels and wharves are also used extensively. Timber, furnished by forests, is very useful and necessary in time of war.

"Another important relation is the one that exists between production and forests. Everyone knows that during war-time one of the great problems is to feed the army, navy and civilian population. In this emergency, forests again become of value as they help to conserve moisture by giving back through the leaves, in the

form of a vapor, what moisture would otherwise have been lost. Every foot of forest timber that is wasted weakens the vitality of the nation."

Alice Plane, of Evansville, submitted a very interesting paper, in which she says:

"Forestry is the science or art of forming, caring for and cultivating forests. A simple definition is forest management, again it is called conservative lumbering. Its object is to make the forest render its best service, yet to increase rather than to diminish its usefulness in the future.

"Forestry is a new science. Before the latter part of the eighteenth century there were few people who knew anything at all of this science and these people were either scholars or practical woodsmen. Although it is hard for us, today, to credit Germany with anything worth while, we must admit that it was she who gave this knowledge to the world. The science spread from Germany to France and thence to the rest of the world. With the exception of China, America has been the last to accept this doctrine and make it practical. We should all be vitally interested in this subject because it is a question which affects each one of us individually, and which affects the welfare and prosperity of the nation as a whole. Forests prevent the drying up of our streams; they protect the headwaters of streams for irrigation. The union of the many streams which have their origin in the forests of the Rockies form our mighty Mississippi River. Navigable rivers would help to obtain quick communication in time of war. A country which is well wooded has a larger rain-fall than that country which is not; and a country which has plenty of rain-fall produces more food than one which has little. Forests prevent the erosion of hillsides and so prevent the destruction of fertile farm lands. They also regulate our water supply that is used for irrigation, and everyone knows the part that irrigation has played in the barren west, to make that country more productive. Because of the condition of the European countries during the war, we know that plenty of food is essential for victory.

"There are three things which win war: men, money and food. Since the forests make better men and protect the people from natural dangers, since it is expected that in the future the national forests will be a source of income to the Government, and since they help in so many ways to make our country more productive, we are, by by taking care of our forests providing the three essentials of war."

The following is taken from the essay of Jesse S. Baily, another prize-winner:

"Wood plays a wonderful part in the life of a nation. It cannot live without it. It is said that Greece and Rome fell because they had no great forests. For many years before the great war, Germany bought all the walnut that she could get in America, but even so she did not have the wood she needed and failed. For years the European nations have known that wood was absolutely necessary for the defense of a nation and have planted great forests. The European nations have no ground to waste. Europe is smaller than the United States but she has many times as many people. She has seen the need of having timber so has planted vast forests.

"The relation of forests to National Defense need hardly be mentioned. During the war something was heard from the Government on this subject. Spruce was needed for airplanes. Not common, ordinary spruce, but the finest, straight grained spruce only could be used. Black walnut was in demand for gunstocks. Boy scouts searched the country over for walnut trees and many were found. No satisfactory substitute has been found for wooden railroad ties and these form a large item in the expense of railroads.

"Wooden ships are used more extensively than any other, and the United States needs every ship it can get for use in foreign trade to make a market for our goods and thus stimulate our manufacturing and production of raw products. We do not always understand the advance in price of our favorite newspaper. It is because wood pulp cannot be gotten. Why is this? Because the timber has been wasted, there is less wood pulp and the manufacturers wish to save for future use. The United States might do as foreign governments have done—start forests, but plant such trees in the forests as will be beneficial for the defense of the country. Spruce and black walnut are two that it would be well to plant."

While Charles W. Hebbinghaus, of the Central High School of Evansville, writes:

"If we should go deeply into the question of what the essentials to the defense of our great country—and, in fact, any nation—we would find that one of the chief factors is forestry. For were it not for this great industry, no ships could sail upon the ocean, nor could any guns equip our soldiers.

"In the first place, the trees which grow in our many great forests, furnish the wood for the construction of the great ships which constitute our navy; or, in case of our modern iron-clad vessels, they furnish wood for the framework, furnishings, flooring and all the woodwork of our ships.

"In the second place, no army could carry on a war were the country devoid of forests. For it is of the strong, hard wood of our black walnut trees that the stocks of the guns which equip our fighting men are constructed. A third instance, last, but by no means least, is that the trees yield wood for the providing of shelter for our soldiers—that is, the dugouts of the trenches, in which our soldiers repose; and these are constructed almost solely of wood, and it is quite plain that no army which was utterly devoid of means of shelter could continue to exist very long.

"Therefore, from these three illustrations, it is quite evident that one of the chief essentials to national defense is forestry, since it yields such a useful product therefor, and for these reasons, it behooves every owner of large forests to obtain from them as high an amount of production as possible."

MEMORIAL TREES—OUR HEROES' HALL OF FAME

MEMORIAL tree planters are erecting their own Hall of Fame for their heroes. The "Hall" will be vaulted by that "inverted bowl we call the sky" and the memorial trees will be placed on "Roads of Remembrance," in memorial groves and as the proper setting for the various forms of memorials. The trees being planted now will be famous fifty years from now and even more famous in a hundred years. Communities throughout the land are planting trees and dedicating them.

The Dumont Kennedy Elm at Crawfordsville, Indiana, is one of the best examples of famous trees with a war association. AMERICAN FORESTRY pictured this tree last month. Mr. Kennedy is hearing from all over the United States about that tree as a result of entering it in the Hall of Fame. This tree stands on one of the most famous little streets in the country. There are five houses on the street—Lincoln Street, by the way—and from those five houses went nine boys to the war for humanity. Every one of these boys had played beneath the shade of that tree. They all volunteered when the Mexican trouble came up. They did the same when their country called to enter the world war. A monument was placed on the little street and Senator James E. Watson, of Indiana made a speech. The names of those boys who played beneath that tree are: Ora Jolley, Ray Jolley, Forrest Jolley, John Hilliard, Harry Hilliard, Howard Fisher, Louis Spilman, Harry D. Michael, Clyde Suitor. Is there another Lincoln Street? Are these trees on it? If not let us put trees on such streets and on all streets. This tree dedication is but an indication of what any community can do.

In Baltimore tree planting has been started on a fine scale. The AMERICAN FORESTRY has received an account of the tree planting there from Mrs. J. Barry Mahool. Other organizations may learn from this statement what can be done in tree planting. The account follows:

The "Grove of Remembrance" in Druid Hill Park was dedicated to the fallen heroes of the world war by the visiting delegates to the convention of "War Mothers of America." During the convention all visiting delegates affiliated into one organization, now known as the "Service Star Legion." The ceremony was deeply impressive as well as very beautiful, in fact, so impressive was the scene that Cardinal Gibbons, who had come only to pronounce the benediction, made a brief address, paying tribute not only to those who had made the Supreme Sacrifice, but to the motherhood of the land gathered at this shrine. At the head of the parade marched 1,000 school children each carrying an American flag, and singing patriotic songs. Behind them came twenty War Mothers, members of the Ohio delegation, carrying the flags of the Allies. These formed an escort of honor for the invited guests who followed on foot: Ambassador Jusserand accompanied by Mrs. J. Barry Mahool, Madame Jusserand with Colonel Wilcox, Governor Harrington, of Maryland, with Mrs. T. Parkin Scott, Mrs. Harrington with Judge Oscar Leser, and Mayor Broening, of Baltimore. Delegates carrying their state flags or banners followed. The following states were represented: Alabama, Arkansas, California, Kentucky, Massachusetts, Maryland, Montana, Mississippi, Ohio, Oklahoma, Indiana, Iowa, Illinois, New York, Nebraska, Utah, Pennsylvania and Washington State. Commander P. H. B. Weems had charge of the military division of the parade, composed of a detachment of G. A. R. veterans representing the Wilson and Dushane Posts of the Department of Maryland; Red Cross Workers, followed by soldiers, sailors and marines. At the end of the procession were automobiles with twenty wounded men from Fort McHenry.

The French Ambassador threw a spade full of earth upon the tree planted in memory of the dead of France. Governor Harrington followed for Maryland, Mayor Broening for Baltimore and the delegates for their states. At the Michigan tree Mrs. Mary B. Westnedge, of Kalamazoo, planted the tree not only for the slain of Michigan, but also for her own son, Colonel Westnedge, of the Twenty-Sixth Infantry.

In the Iowa delegation Mrs. Lew McHenry, a connection of the old Maryland family of McHenry, and Mrs. Murdo McRea, planted the state tree in memory of the brave sons of Iowa who had made the supreme sacrifice as well as for her own sons, Captain Harry McHenry, of the One Hundred and Sixty-Eighth Infanry, and Corporal Donald H. McRea, who were killed in a surprise attack of the Germans in the Luneville sector.

At the Massachusetts tree a Gold Star sister, Miss Evelyn Harpell, threw on the spade full of earth on the tree in memory of Massachusetts dead and her own brother, Sergeant Carroll D. Harpell, of the One Hundred and Third Machine Gun Battalion.

At the Ohio tree stood Mrs. D. McPherson wearing a Gold Star for her only son, John D. McPherson, Company C, Signal Corps, Forty-First Division.

At the West Virginia tree stood Mrs. Eugene Cordell and Mrs. J. M. Gribble. Mrs. Cordell wearing a Gold Star for her son, Sergeant Littleton Tazewell Cordell, Twenty-Ninth Division, One Hundred and Tenth Machine Gun Battalion.

With four sons in the war, Mrs. J. E. Linscott, of St. Petersburg, Florida, planted the tree for her state. One of these four boys, William Milton Hance, of the Twelfth Machine Gun Battalion, of the First Division, lost his life in the Argonne sector.

Mrs. A. W. Funkhouse, of Indiana, cast the first spade full of earth on the tree for her state. She wears two Gold Stars for two sons, Lieutenant Albert Craig Funkhouse, Company H, One Hundred and Forty-Fourth Infantry, Thirty-Sixth Division, and Second Lieutenant Paul Taylor Funkhouse, Company B, Seventh Machine

"HALL OF FAME" FOR TREES



Above—The Sir Joseph Hooker Oak, at Chico, California, which has been entered in the Hall of Fame of the American Forestry Association at Washington by C. C. Royce. Is there a famous tree in your town? This oak, according to Gen. W. T. Sherman, would shade 7,000 men at noon. Six feet above ground the tree's circumference is 28 feet 4 inches. The height is 110 feet. The longest limb is 102 feet. The tree is in a park deeded to Chico by the widow of Gen. John Bidwell.

Below—Standing in the Friends Cemetery at Salem, New Jersey, this oak is nominated for the Hall of Fame for Trees being compiled by the American Forestry Association by Cora June Sheppard, of Shiloh, New Jersey. Under this tree in Revolutionary days soldiers of Washington's Continental Army were drilled. The tree has a spread of 111 feet. Surveyors say its branches cover almost a quarter of an acre. The highest branch is 88 feet from the ground and its circumference two feet above the ground is twenty feet. The tree is known to be 300 years old.

"HALL OF FAME" FOR TREES



Above—The largest Live Oak in the South, a veteran in 1763, has been nominated for a place in the Hall of Fame for Trees being compiled by the American Forestry Association at Washington. The Association wants reports on all trees with a history or of unusual size for its "Who's Who." A. D. Dart, of Oriental, North Carolina, who makes this nomination, says it was called "Lovers's Oak" by the Indians. The tree is in a public park at Brunswick, Georgia, and a foot above the ground the circumference is 28 feet. This photograph was taken with the sun directly overhead and the shadow measured 90 feet in diameter.

Below—The most famous tree in Indiana is at Corydon. It is the Constitutional Elm, and it has been nominated for a place in the Hall of Fame of the American Forestry Association at Washington, which is hunting for the trees of America with a history. On June 10, 1816, members of the Constitutional Convention met beneath this tree, which is on the banks of Big Indian Creek, and a few hundred feet from the first State House. The tree has a spread of 124 feet, according to C. C. Deam, State Forester.

Gun Battalion, Third Division. At this tree Mrs. W. E. Gymer also participated in the ceremony in memory of her son, Lieutenant Alfred K. Gymer, Three Hundred and Fifteenth Infantry, Eighty-Fourth Division.

At the Pennsylvania tree there were eight Gold Star mothers who threw earth upon the tree planted for Pennsylvania heroes who included their own sons—Charles P. Holoran, James Austen, Wm. John Miller and Robert A. Miller, Alfred Peter Stumpf, Edward McL. Wise and Raymond Horne.

At the Maryland tree, surrounded by flowers brought from the Green Spring Valley in memory of the boys of the Valley, stood Governor Harrington, who threw on the spade full of earth in memory of Maryland's brave sons. With him was Mrs. A. F. Fraley whose son, Lieutenant Earl Fraley, of the Three Hundred and Thirteenth Infantry, had made the great sacrifice.

At the tree planted in honor of Baltimore's own were Mayor William F. Broening, Mr. and Mrs. J. Barry Mahool, the latter wearing a Gold Star for their son, Captain George Frame Mahool, of the Forty-Fifth Artillery; Mr. and Mrs. August Ritter, whose son, Christian Ritter, Jr., of the One Hundred and Fourth Ammunition Supply Train, Twenty-Ninth Division, was one of those who did not come back; Mrs. Anna Barrett, mother of Joseph Barrett, killed in the Navy Yard, Philadelphia; Mrs. E. J. Croker whose son was lost at sea; Mrs. P. J. McLernon, mother of John McLernon; Mrs. K. Golden Kennelly, mother of John Golden Kennelly, killed in France the day the armistice was signed; Mrs. George W. Thompson, mother of George Potter Thompson, Company C, One Hundred and Fifteenth Infantry, killed in the Argonne; Mrs. Ella Hart, mother of Edwin Sommerfield Hart, also of the One Hundred and Fifteenth; Mrs. Elizabeth S. Tillman, mother of Frank R. Tillman, Thirty-Third Artillery; Mrs. John H. Butler, mother of Lieutenant Edward E. Butler, of the U. S. Air Service, killed at Issoudun, France; Mrs. Richard Lynch, mother of Vernon Lynch, killed at Government Experiment Station in Washington.

The musical program was under the direction of Mr. Frederick R. Huber, director of the Baltimore Symphony. The service was concluded by the rendition "A Golden Star," by Sousa, in memory of Quentin Roosevelt, and dedicated to Mrs. Roosevelt. Mrs. Robert Carlton Morris made the dedicatory address.

A grove of trees similar to this, but much smaller, was planted in Patterson Park, Baltimore, Md., as a memorial to the Baltimore boys from East Baltimore, who lost their lives in the war. This was under the auspices of Mrs. George W. Hughes, 253 Ellwood Avenue. On November 16 a tree was planted by the congregation of Baldwin Memorial Methodist Episcopal Church, Severn Cross Roads, Anne Arundel County, in honor of eight members of the church who participated in the war. The tree was presented by Mrs. Robert A. Welsh, president of the Anne Arundel Chapter of the D. A. R.

There is inspiration in every line of this account of memorial tree planting. The Service Star Legion plans even more extensive planting the coming spring. At York, Pennsylvania, the Women's Club in conjunction with the Chamber of Commerce has taken over a big program for planting the Lincoln Highway. A wonderful legacy is to be left to the coming generation. Will you have a part in this legacy by taking the lead in your community? All this work needs is leaders in each town. What finer memorial than to have it said, "He planted trees."

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

BRIDGEPORT, CONN.

By Crain Company, of Bridgeport: Sgt. Ronald M. Peck, James J. Mulligan, Martin A. Anderson, Howard Olmstead, Albert Waller, Thomas P. Healey, Ingacas Baltuaraitis.

COLLEGE PARK, GA.

By Presbyterian Church: Douglas Connally Lyle.

MILLEDGEVILLE, GA.

By Mrs. L. J. Anderson: Lt. John Wilcox Anderson.

LOGANSPORT, IND.

Civic Class of High School: 359 Students of School who answered Country's Call, Lt. Joseph Wilson, Frederick Banta, John Parker, Harry Grohs.

HOBART, IND.

By Miss Elizabeth Maybaum: Harold Maybaum.

INDIANAPOLIS, IND.

By Service Star Legion: Theodore Roosevelt.

INDIANAPOLIS, IND.

By Indianapolis Orphan Asylum: Theodore Roosevelt, William Warner, Curtis Simmons.

INDIANAPOLIS, IND.

By Ben Davis Chapter, American War Mothers: Corporal Clark Moore.

FRANKFORT, KY.

By Bridgeport Graded and High School: Heroes of World War.

LOUISVILLE, KY.

By Second Ward School: Sgt. York, General Pershing, General Hale, President Wilson, Gen. John B. Castleman, Ernest Kettig. By Nicholas Finzer School: Lawrence Smith. By J. Stoddard Johnston School: Raymond Lurding, Robert Prince, Clarence Philips, Robert Smith, Soldiers who died in recent war. By Albert S. Brandeis School: Dr. Samuel Brandeis, Mrs. Caroline Brandeis, Albert S. Brandeis, Richard C. Brandeis.

BOROUGH OF MIDDLESEX, N. J.

By Watchung School: Holmes Marshall, Russell Hall, Benjamin H. Giles, John H. Down, Benjamin Efinger.

ELMIRA, N. J.

By Elmira Rotary Club: Lt. Harry B. Bentley.

METUCHEN, N. J.

By Chamber of Commerce: Edward C. Fugel. Harry Hansen, George R. C Smith, Archie Hummer.

LUMBER BRIDGE, N. C.

Mrs. J. W. Hall: Joseph L. Shaw.

ADDYSTON, OHIO

Sgt. Cecil Rowe, Benjamin Steelman, George Hayhurst, James Hennessy.

HATBORO, PA.

By Home Defense: Frank G. Girard. By "The Neighbors" Woman's Club: Alvah Chandler Williams, Frederick Edward Gensel.

MEMPHIS, TENN.

By Mrs. E. S. Conser: Frank S. Latham, Jr.

APPLETON, WIS.

By Appleton High School: William Heiss, Harvey Pierre, Cylus Bogan, Elmer Witthuhn, Irving Roth, Clarence O'Connor.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE Annual Conference on Fire Protection, under the auspices of the Quebec Forest Protective Association will be held in the Windsor Hotel, Montreal, on the 28th of January. The special topic to be discussed will be railway fires—that is, the number of fires set by railroads and the best course to be pursued in eliminating this hazard. The reports of the St. Maurice Forest Protective Association for the past season show 60 per cent of the fires to have been set by railroads, most of them by the Canadian Government—owned lines, and practically all the fires were set by a few defective engines which scattered sparks day after day. There is absolutely no excuse for such conditions and drastic action must be taken.

An effort will be made to make this meeting a little different from the usual routine. There will be only one paper read and the meeting will then be thrown open for general discussion on a list of topics to be issued with the programs so that everyone can come prepared. Speeches will be limited to five minutes.

On the 29th the Meeting of the Woodlands Association of the Pulp and Paper Association will be held and the program will be the same as that of the Conference, only one paper and then general discussion along the lines of the following topics: airplane mapping and timber reconnaissance; slash disposal with reports on the experiments carried out by the Laurentide, Bathurst and Abitibi Companies; the use of tractors in woods operations; pulpwood scaling and the possible further elimination of waste in logging. These meetings will be thoroughly practical and it is hoped that many American lumbermen, paper men and foresters will join us.

The writer has just made a trip to Florida, and from Washington south to southern Florida the engines were setting fire to the woods so that the evil is not confined to Florida. Along the line of the Atlantic Coast Line ground fires were burning almost everywhere and often young timber was being entirely killed.

Perhaps the Canadian National Railways may eventually find it cheaper to fix their engines than to pay damages. Leave is being asked of the Crown to sue the Railways Department in two cases for $143,000 and $185,000, respectively, and two other suits will probably be brought.

There will be a large convention of the Canadian Forestry Association held in Toronto sometime in February to discuss the situation in Ontario. The new Minister is making a thorough investigation of the whole question and much progress is hoped for. Better fire protection is needed and the entire elimination of political patronage. The placing of the administration of the forest lands of the Province under the Forestry Branch is also urgently needed.

This same situation is also to be met in the Dominion Forest lands and the Hon. Arthur Meighen is turning his attention to this situation and making a study of the situation. He is a man of vision and is planning great improvements in the administration of the water powers and forest reserves and it is to be hoped that he will consult men who understand the situation and are not tainted by party politics. He is also looking into the subject of making maps of the great unsurveyed areas in the West by aerial photography and some experiments may be tried out during the coming summer.

In 1918 the Union Government of South Africa voted fifty thousand pounds sterling for reforestation, which will be undertaken at once. In the last normal year, 1913, the imports amounted to 17,500,000 million cubic feet, 90 per cent of which was coniferous, worth one million two hundred fifty thousand pounds sterling; and the Chief Conservator of Forests estimates that even if all the possible forest resources are ever developed they are never likely to be able to provide more than five per cent of the country's requirements. Assuming, on a very conservative estimate, that an acre of plantation will yield 100 cubic feet of timber per annum, it will take 350,000 acres to produce the probable requirements of the country in fifty years time. At present there are only 70,000 acres of Government plantations in the Union, and of these 20,000 acres are for special purposes, as, for instance, 7,000 acres in the Transkei to provide hut wattles for the natives. The above shows the need for prompt action. The work at present is being confined chiefly to mountain land which is of little value for any other purpose, but the question of accessibility for easy distribution has not been overlooked.

Plantations have been started which will total 92,275 acres, of which 3,933 acres will be planted yearly and the total cost will be £49,125. The different works will take from five to fifty years to complete at an average cost per acre of slightly less than £13.

An interesting comparison is drawn between the revenue from the indigenous forests and from the plantations. That from the latter is nearly double that from the former, and more than double if the railway plantation returns are taken into account. The yield of timber and firewood from the planted forests is also much greater than from the natural forests. From the Western Conservancy, a planted area 800,000 cubic feet worth £11,000 was cut during the year; whereas, from the Midland Conservancy, the most heavily forested of the natural areas in the Union, the yield was only 394,000 cubic feet worth £6,000.

As the world's consumption of timber is increasing while the forested areas are decreasing, it is of national importance for South Africa to supply a large part of its own timber requirements and make itself as independent as possible of foreign supplies.

The Journal of the Spanish Forestry Assoication, *Los Amigos del Arbol*, gives some extracts from AMERICAN FORESTRY and pays it some nice compliments.

The Spanish River Pulp and Paper Company at Sault Ste. Marie, Ontario, has started a night school with a good attendance.

The New Brunswick Forest Service will commence experimental planting next spring with a ten acre tract. This has been clean cut and will probably be planted with spruce.

The white spruce failed to seed all through eastern Canada last year and there is practically no seed to be had. The crop of Norway spruce in Scandinavia was very poor last season and the supply will be short and prices high next year.

The Forestry School of the University of Toronto is asking prominent foresters and lumbermen to address their students on the qualities which go to make a good forester. This should be helpful to the students, if the men who speak really know to what their own success is due.

The Research Department of the Laurentide Company is experimenting with the cooking of jack pine with the sulphite process.

EDITORS URGING PERMANENT

THE Christmas Tree cover of the AMERICAN FORESTRY attracted a great deal of attention from the editors of the country. Dr. Frank Crane, who writes for a syndicate of newspapers, reproduced it as a Christmas feature. The Association has received many letters in regard to permanent Christmas trees which the Association advocates as a means of keeping alive the ideals of Community Service and the community spirit the year around. The Association has urged that wherever possible a community transplant a tree that will stand the year round as a center of all community effort as well as the center of the Christmas exercises.

Profiteers in Christmas trees had a great surprise when people refused to pay from $4 to $10 each for them. The Associated Press dispatches to the *Washington Star,* say:

Pittsburgh, Pa.—Pittsburgh produce men are seeking ways and means to dispose of some 40,000 Christmas trees left unsold on the market without destroying them. Fifty carloads of trees remain in the produce yards awaiting disposition. Eighteen carloads were taken to a dump yesterday and thrown away.

New York.—Speculators in Christmas Trees in New York were hard hit this year, and dealers who had hoped for big profits have hired truck men to cart many remaining firs to the bay. Others were turned over to janitors to help heat apartments.

The American Forestry Association has no quarrel with intelligent Christmas tree cutting but when profiteering enters into holiday things it seems time to call a halt. Our view is well expressed by the editor of the *Buffalo Evening News,* who writes:

"Many American cities have adopted the Community Christmas tree as an annual institution. But so far it has always been a dead tree, set up temporarily, to be removed as so much rubbish.

"Now comes the American Forestry Association with the suggestion that the tree be a living one. Such a tree would be all the more attractive because of its permanence. It would take on character in keeping with its use.

"Children and grown-ups who love Christmas would love that tree. It would be a source of pleasure and enjoyment all the year round."

In the opinion of the editor of the *Cleveland Plain Dealer,* "the Christmas tree is too praiseworthy an institution to be abolished unless the need is too plain to be questioned. There is, as yet, no reason for abandoning the use of Christmas trees, but there is abundant reason for preaching discretion and common sense in the harvesting of the trees.

"The Christmas trees, mostly spruce, with some pines, firs and hemlocks, have in the past been gathered indiscriminately. Any small tree that has caught the fancy of the axman has been ruthlessly cut. The value of the trees thus destroyed reaches millions of dollars each year."

The matter is one of grave concern to the *Christian Science Monitor* whose editor writes: "One thing worth noting about the present holiday season in the United States is that its celebration, compared with previous years, apparently brings somewhat less harm to the forests. Year by year, the cutting of evergreen trees has seriously affected the value and beauty of the wooded area, until, at last, the thought of tens of thousands of trees annually destroyed had become a matter of grave concern. Now it has been realized that the waste is needless, that the forest may actually be improved by removing practically worthless trees, and that these trees can be built up, by boring holes in the trunk and inserting additional branches, until they answer yuletide purposes quite as well as any that might have been selected."

There are few more valuable suggestions in the mind of the editor of the *Dallas Evening Journal,* who speaks of the toll each year and then adds: "Roughly estimated, there are a near million homes in Texas. Say that a Christmas tree is deemed essential in a half-million homes, not figuring the thousands of shop windows that must have them to meet the requirements of the season. That would mean 500,000 young trees removed from the forests of Texas, new growth which, if permitted to stand, would within a generation take the place of their elders and make less difficult the work of reforestation that is going to be necessitated.

"The green that is needed to give a festive touch to the home decorations can be obtained, and should be, without destroying baby trees. This isn't a kill-joy suggestion. It is practical. And at its heart lies the seed of self-protection."

Why not prepetuate a happy Christmas with a growing tree is the question asked by the editor of the *Detroit Free Press,* who points to what a sad thing a stripped and dead Christmas tree is. He writes: "The Christmas tree, denuded of its gifts and decorations, is a sorry sight in the backyard after its brief period of pleasure-giving is over. One can but feel regretful at the fate of a thing once so full of life and promise. The artificial Christmas Tree is a poor substitute for the real thing. It has been suggested that instead of the tree life thus terminated, we should call for evergreens that have been lifted, roots and all, set in a pail or tub with earth enough to make them solid, use them as desired and then set them aside to be planted out in the spring, thus performing the double service of Christmas tree and ornamenting the premises afterward, instead of becoming unsightly rubbish that must be carted away. The plan sounds feasible and though involving an increased expense, makes a certain return for the investment if the tree is replanted.

"Some hundreds of acres are cut over annually through selection of the finest and best-shaped conifers for shipment at the holiday season. In view of our diminishing forests and of the number of trees provided which remain unsold, the present wasteful methods ought to be reformed."

That the growing of Christmas trees should be an industry and serve a double purpose is the view of the editor of the *Youngstown Telegram,* who tells of the plans in Ohio in the following editorial:

"THE HALL OF FAME"

The Boston Herald's editor gives a generous half column to the Hall of Fame For Trees of the American Forestry Association, saying in part: "The American Forestry Association believes that the time has passed for regarding the tree merely as building material, as a source of paper or as so much potential firewood. It is gathering photographs of the most remarkable trees in the United States for a 'Hall of Fame.' How many of us realize the aptness of the lead thus followed? Folklore students and ethnologists show that there was a period in human history when our ancestors worshipped trees and regarded them as the pregenitors of the race. In our own land the association has a vast continent in which to make selections. Well indeed has the oldest living thing on earth justified its title to a place in the 'Hall of Fame for Trees.'"

CHRISTMAS TREES FOR COMMUNITIES

"Growing Christmas trees is the latest industry suggestion for Ohio. The forestry department of the state experiment station at Wooster, believes it would be a profitable industry, and there is no doubt that it would be since only ground that is otherwise valueless need be used.

"Yet there are thousands of acres of almost barren land in Ohio admirably suited for the growth of spruce, and 'Christmas' and not pine as so many believe. The evergreen is a slow- grower but the forestry department says 2,500 Norway spruce can be grown to a size suitable for Christmas decorations on an acre of ground in four to six years, and will bring perhaps 60 cents each. Netting that return on poor ground is worth while, and in addition really valuable trees now cut down merely for temporary decorations would be saved."

Keener and keener becomes the drive for a national forest policy on the part of the editors. The print paper situation has brought them to a halt in many places. In the view of the editor of the *Ithaca Journal* the situation is this: "The American Forestry Association is trying to have the government adopt continuous policy of preservation of the forests, something going far beyond the effort now being made to protect them from destruction by fires. Reforestation is the special policy upon which continuation of forests for future generations chiefly depends, accompanied by more stringent regulation of the cutting of timber for the protection of the small trees and younger growth. Planting seeds is a slow process, especially in the burned-over areas. It must be done on a large scale to be effective."

"Shortage of print paper," says the *Illinois State Journal*, "and discussion of the problem which it involves has created a healthy revival of the forest conservation movement. Demand for a policy embracing something more substantial than the parking of vast tracts of the public domain and policing the forests against fire is taking form.

"How many Americans are aware that the American forests are disappearing rapidly?" asks the editor of the *Jacksonvilee Times-Union*. "Yet the warning comes from many authoritative sources. Charles Lathrop Pack, president of the American Forestry Association, says the United States has only about one-fourth of its original forest and this is now disappearing very much faster than it is being reproduced. 'The United States must decide upon a national forest policy in order to perpetuate its timber supply,' he declares. 'We have no adequate forest policy now. We are far behind France, Great Britain, Germany, Japan and other nations in this respect.'

"Protection against fire, proper thinning out when it is needed, and replanting are three of the main requisites in forest culture. Fire is the chief enemy of the forest, as the almost yearly accounts of extensive fires which occasionally rage in the great forests of the still heavily wooded Northwest shows. Thinning out produces more merchantable timber and replanting as trees are removed for timber or for firewood perpetuates the forest. All of these are factors in an intelligent forest policy.

HERE'S THE HISTORY OF JOHNNY APPLESEED

DURING the first decade of the nineteenth century, when Ohio was still a vast wilderness, save for a few river and lake towns, a queer looking man came down the Ohio in a canoe, towing another, and both were loaded with sacks of apple seeds, according to High Spots in Ohio's History in the *Columbus Citizen*. The work of the American Forestry Association of Washington, D. C., in campaigning for memorial tree planting and the planting of fruit or nut bearing trees wherever possible, particularly in the gardens of the country, makes the life story of "Johnny Appleseed" interesting at this time.

The man was John Chapman, known in Ohio history as "Johnny Appleseed," who did more for encouraging the growing of apples within the Buckeye State than any man who has come after him.

Johnny went ashore in what is now Jefferson County and at a spot nine miles below Steubenville he planted his first orchard. This was in 1806. He had brought the seed from cider mills up in Pennsylvania.

For more than 30 years following this, Johnny Appleseed was a noted character in the wilds of Ohio. Every pioneer family knew and loved him and every latchstring was open to him.

People in those days called Johnny "queer," but even so, he had a wide influence on their lives. He was educated, refined and polite and everywhere he went throughout the state he carried a Bible and a few books with him and of evenings, as he enjoyed the hospitality of some log cabin he would lie before the fire and read to the family and expound religion.

Johnny's idea was to set out orchards in various parts of the state so that there would be young trees ready for the new settler to plant on his land when he arrived in Ohio. In the course of a year Johnny would travel hundreds of miles going from one orchard to another, pruning and taking care of the young trees that he had planted.

Although the forests abounded with hundreds of savage Indians who were continually murdering the whites, none of them ever bothered Johnny. They regarded him as a wizard and the fact that he never carried a gun convinced the Red Men that he was under the special guidance of the Great Spirit.

An early Ohio historian describes Johnny as follows:

"His nature was a deeply religious one and his life was blameless among his fellowmen. He regarded comfort more than style and thought it wrong to spend money for clothing to make a fine appearance. He usually wore a broad-brimmed hat. He went barefooted not only in the summer, but often in cold weather, and a coffee sack, with neck and armholes cut in it, was worn as a coat.

"Upon his journeys Johnny usually camped out. He never killed anything, even for food. He carried a kit of cooking utensils with him, among which was a mush pan, which he sometimes wore as a hat."

During the War of 1812, when the British and the Indians were terrorizing the population of Ohio, Johnny often warned the people of approaching danger.

Once, the Indians killed a man in Richland County and the residents of Mansfield fled to the blockhouse which was the town's public square. It was believed a general massacre was about to be attempted by the savages and it was imperative that help be secured from troops that were then at Mt. Vernon. But who would go? The Indians were lurking on every side and it was thought to be certain death for any messenger who might attempt the trip.

Johnny Appleseed, barefooted, bareheaded, volunteered to go. That night he disappeared into the woods and between Mansfield and Mt. Vernon he visited many settlers' cabins and warned them of the danger. When he returned to Mansfield it was with enough help to overawe the Indians and prevent the attack.

In his late years Johnny left Ohio and went to Fort Wayne, Indiana, to live with a relative. There he died in 1847.

The Southern Pine Association

maintains a department of Cut-Over Land Utilization, which, with the U. S. Department of Agriculture and other agencies, is seeking to determine the best uses which can be made of the cut-over lands in the Southern States. The logical division for the utilization of these many millions of idle acres are—

1st—AGRICULTURAL DEVELOPMENT

2nd—LIVE-STOCK RAISING

3rd—REFORESTATION

An informative and reliable book describing in full the opportunities afforded on the cut-over pine lands of the South has been published, and is distributed free to all requesting it.

SOUTHERN PINE ASSOCIATION
NEW ORLEANS, LOUISIANA

DR. SCHENCK WRITES FROM GERMANY

GORDON DORRANCE, of the Maryland State Forestry Department, has received an interesting letter from Dr. C. A. Schenck, former head of the Biltmore Forest School at Asheville, North Carolina, who is now in Hesse-Darmstadt, Germany. Dr. Schenck, after fifteen years teaching forestry in the United States, returned to Germany shortly before the war. He was badly wounded while serving on the Russian front, later saw service in Belgium and was retired from active service in 1916.

Dr. Schenck says:

"As regards forestry in Germany, there is little to be said about it. Prices for forest products are intolerable; building impossible; while the foresters continue to consider forests as their own. We could, without a doubt, obtain more of a livelihood from them than we are doing, though bread is more badly needed than is wood. Meantime, there is but little over-cutting. Fortunately, I dare say, for if the forests are a nation's savings-box, the time has surely come for Germany to empty it.

"Graves' (the present chief forester's) schemes for a wider application of American forestry have have interested me greatly. I think your national forest reserves will flourish, more than I ever expected. What became of Pinchot? I long for American papers—and can get none here.

NATIONAL FOREST HIGHWAYS

THE Secretary of Agriculture has approved the construction of the Grand Canyon highway on the Kaibab National Forest with a maximum expenditure of federal funds of $50,000, provided co-operation could be secured from the county to the extent of construction within the forest and maintenance of the road between Kanab and the forest boundary. In Nevada he has approved the construction of the Currant Creek road with a maximum expenditure of federal funds of $25,000 and the Austin-Eureka road with a maximum expenditure of federal funds of $18,000, provided 50 per cent co-operation is secured. In Utah he has approved the construction of the Kane County section of the Cedar-Long Valley road with a maximum expenditure of $35,000 and the construction of the Salina-Emery road with a maximum expenditure of federal funds of $65,000 and the construction of the Panguitch-Tropic road with a maximum expenditure of federal funds of $30,000, provided 50 per cent co-operation could be secured on all the Utah projects. In Wyoming he approved the expenditure of an additional $50,000 on the Hoback Canyon road provided that at least an additional $20,000 could be secured in co-operation.

SEEKING TURPENTINE IN THE WEST

The longleaf pine forests of the South are becoming so rapidly depleted by heavy cuttings of timber and destructive methods of turpentining that many turpentine operators who have depended on this species for naval stores are now turning their attention to the West as a possible source of such stores when their present stands of timber are no longer productive. It is quite possible that a method of turpentining similar to that carried on in the Florida National Forest, under the supervision of the Forest Service, can readily be used in the West. According to this practice the largest flow possible without injury to the trees is obtained by following a number of slashings with several seasons of rest. The cutting is done in such a way as not to impair the timber value of the trees. The promising results obtained by the Forest Service in applying these conservation methods to long-leaf pine in Florida led it, as early as 1911, to investigate the extent to which western yellow pine, so abundant in the United States, could be utilized in meeting possible future needs. Tests show that these trees can be turpentined successfully and that a satisfactory product can be obtained.



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STATE NEWS

CALIFORNIA

ADDED protection to California's fish and game is assured by a cooperative agreement just executed by Game Commissioner Carl Westerfield, of the Fish and Game Commission of California, and District Forester P. G. Redington, representing the Federal Forest Service. "Wild life on the National Forests in California is a resource which, besides being of great economic value, adds materially to the enjoyment of the Forests by the people of the State," says Commissioner Westerfield in commenting on the agreement. "Since the Forest Service is entrusted with the management of the National Forests, on which both fish and game are plentiful, and since the protection and perpetuation of that fish and game is a duty delegated to the Fish and Game Commission by the State, I consider the cooperative agreement a most happy one."

Continuous airplane fire patrol of the Angeles National Forest between May 1 and October 31, with a minimum of two planes in daily operation, is urged by the Southern California Section of the Sierra Club in a resolution recently forwarded to Chief Forester H. S. Graves at Washington.

The loss by forest fires of thousands of acres of timber and brush within Los Angeles County, a loss which is inestimable when the vast watershed is considered, might well have been averted if complete and modern methods of patrol were installed, according to Sierra Club officials.

More than 11,000 acres of timber land in the vicinity of Mount Shasta and Lake Tahoe belonging to the Southern Pacific Company was swept by forest fires during the past summer, according to a report issued by the Forest Service.

"It is true that this figure is less than one per cent of the one and one-quarter million acres of Company land which the Forest Service is protecting under cooperative agreement," said District Forester Redington in commenting on the report, "but this does not mean that the fires—and there were over 200 of them—did no damage. The contrary is true, for besides killing mature timber and marring for years some of California's most popular vacation grounds, they destroyed the greater part of the young growth on more than 11,000 acres of purely timber land.

With the public in California becoming more and more interested in forestry problems the California State Board of Forestry has outlined a plan seeking to direct awakening public interest along lines that will bring the quickest and best results.

The plan definitely adopted is in line



with the policy outlined by Colonel Henry S. Graves. Three definite and necessary steps are proposed:

1. Appropriation of sufficient funds for the prevention and suppression of fires.

2. The acquirement by purchase of watersheds immediately necessary for the conservation of water for domestic and irrigation purposes.

3. The acquirement by purchase of logged-off areas, both in the redwoods and pine forests, as a nucleus of state forests to supply timber for future needs.

The amount of money to be asked for has not been definitely decided. It is believed, however, that at least $150,000 will be necessary to install a fire protection and suppression system. It is still a question whether the other two propositions will be financed by direct appropriation or by bond issue.

The California State Board of Forestry is also cooperating with the United States Forest Service in urging upon the War Department the wisdom of Colonel H. H. Arnold's recommendations concerning airplane patrol of the Forests of the Northwest. Colonel Arnold's recommendations are the result of airplane patrol of the forests of California and Oregon during 1919.

More than half of the standing merchantable timber of the United States will, if Colonel Arnold's recommendations are approved, be placed under the watchful eyes of airmen. Eighty million acres of these forests are government owned and represent eighty per cent of the government owned forests in the United States not including those in Alaska. It has been pointed out that the War Department now has the equipment and men and must keep its personnel in training.

Airplane patrols in California and Oregon during 1919 demonstrated to a great degree the value of the airplane in discovering incipient forest fires in remote districts. Besides watching over millions of acres of government owned forests the birdmen at the same time see millions of acres of private and state lands and aid in protecting the lives and homes of settlers. It is proposed to use five squadrons of 18 airplanes each in patroling the forests of California, Oregon, Washington, Montana, Idaho and Western Wyoming during 1920.

ILLINOIS

H. B. MILLER, State Forester, read a paper before the State Horticulturists meeting at Bloomington, Illinois, on December 17, on the "Forestry Situation in Illinois." In February he will be on the program of the Farmer's Institute, at Carbondale, Illinois, the subject relating to farm woodlands.

Considerable stimulation was given to the cutting of cordwood in Illinois during the recent coal strike and many of the smaller towns fell back on the local supply of wood, thus saving coal for the cities. During this time press bulletins were sent out to the papers urging the use of wood for fuel. On the Cook County Forest Preserves, near Chicago, according to Mr. Kennicott, forester, from fifteen to twenty cords of wood were cut daily, this being from dead trees or trees killed by lighting.

There will be several good opportunities for reaching farmers at the University of Illinois during January and February to arouse interest in farm woodlands. Among the meetings will be the Farmers' and Stockmen's Convention at the University of Illinois, and a meeting of all the country advisers in the State scheduled for some time in February. An effort will be made to make special farm woodland exhibits, these being secured from the Forest Service, for both of these events, as well as distributing bulletins relating to farm forestry.

"IN 1872, the late Joseph Field who lives nine miles northwest of White Hall, and owned a large tract of land along the main highway between White Hall and Patterson began the planting of soft maples along both sides of this highway through his farm, a distance of a little more than two miles, and the planting was completed in the following year," writes R. B. Pearce to American Forestry. "The trees were

set fifty feet apart, and formed what in after years became familiarly known in local history as Field's Lane. The trees were cultivated and given the tenderest care by Mr. Field, and they had developed an unbroken line of beautiful shade when in 1883 he died. Following the death of the founder of Field's Lane, the trees attained a size that caused those less devoted to trees to doubt the wisdom of maintaining a long line of shade that was sapping the land for a considerable distance along either side of the line. The north end of the Fields farm passed into the hands of the Sherwin estate, and for a distance of probably half a mile that much of the monument to Joseph Field, Sr., became extinct. Along the west side of the remaining portion the land is at this day in the hands of Capt. Field, a nephew of Joseph Field, Sr., and he declares that so long as he has charge there will not be a tree removed from Field's Lane. Along the east line the situation differs only in a degree. This land is owned by another descendant, Mrs. A. L. Brennerman, of Barrow, Greene County, who just at present is residing at Minneapolis. Mr. Brennerman figured that the sapping of the land along their line of Field's Lane extended inward so far that the crop loss, if it be saved, would be sufficient to pay the taxes on the entire tract. In order to bring this about Mr. Brennerman conceived the idea of thinning out the trees along his land on the east side, and this is being done. When this work was started admirers of Field's Lane became apprehensive lest the grand drive is to become a thing of the past, but Mr. Brennerman gives reassurance that such is not the case by disclosing his plan of leaving every sixth tree. This, he holds, will maintain the beauty of the drive and at the same time restore the loss to the land on account of the great size that the maples have attained.

"Until another generation at least comes into possession of the adjoining land, the main structure of Greene County's most picturesque drive will be maintained as a monument to Joseph Field, Sr., founder of Field's Lane and the most devoted tree lover of his day."

NEW JERSEY

NEW JERSEY has taken active steps for the installation of three new forest fire lookout stations by next spring. They have been made possible through private co-operation to the extent of almost $4,200 which has released a state appropriation of $3,000, contingent upon securing at least an equal amount from private sources.

Two of the new lookouts will be in North Jersey and one in South Jersey. There is also a possibility that the same funds will provide two other additional lookouts. These, with the three now in operation, two in North Jersey and one in South Jersey, promise a material start toward a statewide protective system of this nature, sorely needed for effective progress in forest fire control.

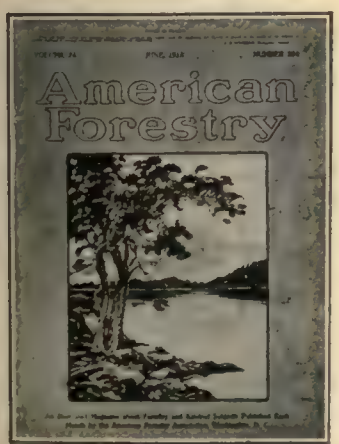
In connection with the proposed Kittatinny Forest Park a complete reconnaissance was recently made of two large tracts of forest land adjoining the Stokes State Forest. These lands may be secured for a very low figure, and would go far toward completing the continuous forest park along Kittatinny Ridge, from the Delaware Water Gap to the New York State line, which is advocated by the Department of Conservation and Development.

The present state forest at that point is most popular as a summer recreation ground, and more land is needed to accomodate the increasing number of campers. The spot is ideal for that purpose, with beautiful mountain scenery, trout streams, many small ponds, and two large lakes nearby, and convenient transportation facilities to all parts of the state.

The land is unsuited for agricultural development, but as a forestry proposition, it is of unquestioned value.

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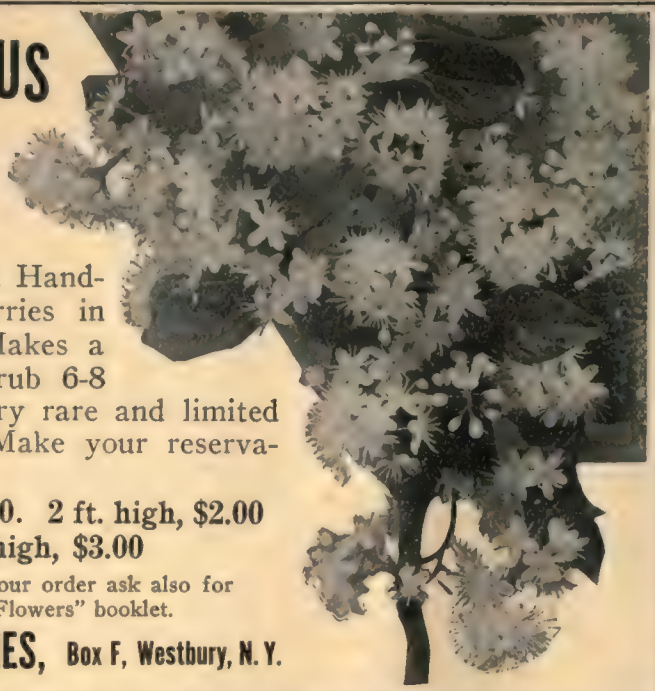
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AUSTRALIA STARTS QUARANTINE AGAINST TIMBER BORERS

PACKING boxes showing the workings of insect timber borers will not be allowed to enter Australian ports if the Federal Director of Quarantine at Melbourne can prevent it. He has called the attention of the American Consul to the fact that officers dealing with food substances and general cargo imported into Australia from the United States find that the packing cases not infrequently are constructed of wood showing the borings or workings of insect timber borers. That destructive wood-boring insects may not be introduced into Australia, the attention of the United States Government and shippers has been called to the matter and it is deemed important that some action be taken to prevent the packing and shipping of goods intended for Australia in wooden cases presenting evidence that wood boring insects are or have been present.

THE TOWN OF YELLOWSTONE

An executive order eliminating approximately 340 acres from the Madison National Forest, on the boundary of the forest which lies close to the western confines of the Yellowstone National Park, was signed by the President December 5. The object of this elimination is to provide space for the establishment of the town of Yellowstone under the town-site laws. Of the total area of 340 acres, 1.03 acres are retained by metes and bounds within the town limits for use by forest officers.

PIGEONS FOR FOREST FIRE FIGHTING

THE carrier pigeons and equipment of the Navy Department will be available for the Department of Agriculture next season for conveying messages from forest fire fighters "at the front" to headquarters, says a recent communication from the Department of Agriculture. The test of the birds for this use was carried out on a limited scale this season but it encouraged the Forest Service officials to believe that they can be employed profitably on a larger scale. To establish a successful carrier pigeon system, it will be necessary to lay plans during the coming winter, to have the posts properly located and get the birds acclimated and begin their training. Flights of 600 miles in a single day have been made, while a distance of 150 to 200 miles means a two or three-hour flight for the average bird. The distance which would be covered in Forest Service work are considerably less than this, in most instances the flights from fire fighting areas to headquarters being less than fifty miles. The value of the birds in mountainous regions where travel is difficult, would be especially great.

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BOOK REVIEWS

Forests, Woods and Trees—In Relation to Hygiene, by Augustine Henry, Professor of Forestry, Royal College of Science, Dublin. An effort is made in this book to interest the statesman, the student of economics, the engineer, the physician and the layman, as well as the forester, in certain aspects of forests and trees, about which vague notions are prevalent. An endeavour is made in the first two chapters to recognize and describe the far-reaching influences of forests and trees on climate, flow of water, erosion of the soil, shelter from wind, purity of air and water, etc. Such influences affect directly the health and comfort of man. The value of forest districts as sites for sanatoria and the history and utility of parks, open spaces, and trees in towns are then discussed. The afforestation of the desolate pit mounds in the Black Country and other districts is shown to be a movement of great interest, especially when, as in some cases, it is taken up by school children.

One effect of the war has to bring home to thinking people the extreme importance of afforestaion. The concluding chapters of the book are, with great fitness for the times, devoted to a study of the afforestation of the extensive gathering grounds, from which so many of the great centres of population obtain their supplies of water. No pains have been spared in obtaining statistics and information as to the physical features, ownership, and extent of these gathering grounds. The work of planting suitable portions of these areas with the aid of disbanded soldiers might be undertaken at once, without any disturbance to other industries. Their afforestation in any case should be linked up with the general scheme of afforestation of the waste lands of Great Britain and Ireland, which it is confidently expected will be undertaken by the State as soon as peace is made. Scattered as the gathering grounds are throughout the country, they will form convenient centres for planting, more especially in the cases where their ownership has been acquired by local authorities. The compulsory purchase of catchment areas, which are not already owned by municipalities, is advisable for sanitary reasons; and the necessary legislation may possibly be introduced when afforestation by the State becomes a reality.

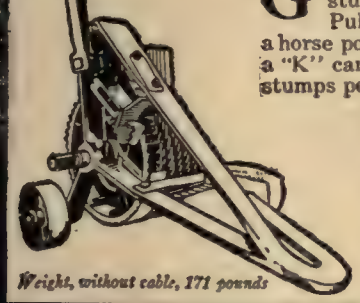
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FOREST SCHOOL NOTES

NEW YORK STATE COLLEGE OF FORESTRY

THE growing demand for foresters not only in America, but in all parts of the world, has been shown by the engaging of Carrol V. Sweet, a graduate of The New York State College of Forestry at Syracuse, for a three year contract in India, for special work involving his special training in dry kiln engineering begun here and continued as a specialist under the federal service at the Forest Products Laboratory at Madison, Wisconsin. Information reached Syracuse that Mr. Sweet will receive a salary of upward of $7,200 a year and expenses for himself and family in the Orient.

Sweet graduated from The New York State College of Forestry in 1917, after taking special work in dry kiln engineering in addition to his required forestry subjects, and after the war went to the government service. The demand for specialists in dry kiln work is shown by the fact that Sweet probably receives nearly three times the salary from his Indian employers that the government was paying him as a forester.

The securing of Sweet for dry kiln work is of particular interest as it comes just as the College of Forestry is announcing a short course beginning March 1 in this particular subject, together with other short courses in timber grading, pulp and paper making, and forestry for boy scout executives and camp directors.

MICHIGAN AGRICULTURAL COLLEGE

EDITORS for this year's M. A. C. Forester have been elected as follows: O. A. Alderman, editor in chief; W. F. Jones and C. F. Martin associate editors. This will be the fifth consecutive year that the forestry club has published this book. Last year's edition appeared in June in spite of the small classes caused by the war and was an evidence of the enthusiasm and hard work of the members of the club. Material is being gotten together for this year's annual and it promises to be a very interesting book.

The forestry club held its annual campfire in the fall. The custom was broken by the war for one year, but this fall's campfire equalled any of the earlier one in interest. A large number of students attended. I. V. Anderson acted as toastmaster, and an enjoyable evening was passed listening to talks, singing and eating.

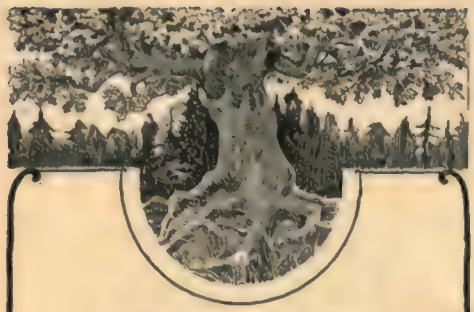
A number of changes are contemplated in the forestry course at the Michigan Agricultural College this year. The work in lumbering, forest utilization, mensuration, and valuation will be increased and a rearrangement of certain courses made placing the mensuration work earlier in the course and regrouping the courses. This is being done in order to make the technical work more intensive and at the same time to leave a considerable amount of latitude of electives.

YALE SCHOOL OF FORESTRY

IN many respects the present year can be considered one of the most successful in the history of the school. The war reduced the annual enrollment to a minimum of seventeen for 1917-1918. Three members of the faculty have been employed for the whole or a part of the war period in public service. With the opening of the present year the members of the faculty engaged in government work returned, and the number of students increased to the normal pre-war basis, the total enrollment to December of this year being thirty-six men, of whom fourteen are now members of the senior class and candidates for the degree of Master of Forestry to be granted June next. The present student body is drawn not only from many states in the Union, but from a number of foreign countries as well. At present four Chinese, three Norwegians, two Brazilians, one Englishman, and one Canadian or a total of eleven foreigners are enrolled. A number of these men are on scholarships granted by their own governments.

A recent compilation of statistics of the Yale School of Forestry shows that 514 students have been enrolled in the regular course and 229 in the short course, a total of 743 who have received instruction. The degree of Master Forester has been granted to 376.

During the past year the Yale School of Forestry received through a gift a tract of approximately 1,500 acres of mixed hardwoods, some 35 miles from New Haven. A lumbering operation having for its object the salvage of the dead chestnut was



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begun soon after the property was received. This operation will net the school about $2,000.

The Keene Forest of more than 1,000 acres, was given to the school several years ago. It is composed chiefly of young stands of white pine. Considerable progress has been made within the year in increasing the holdings near Keene and in selling of detached lots some distance from the city. 60,000 white and red pine seedlings were planted in the spring. The book value of forest property now owned by the school, together with endowment and maintenance of the same exceeds $72,000.

A recent compilation of alumni statistics shows that exactly fifty graduates of this school are on the faculties of twenty-four universities and colleges, where they are engaged in teaching forestry, and of this number fifteen are deans or directors of schools or are the heads of departments of forestry.

Mr. William Stuart Moir, of the class of 1917, is engaged in a year's study of forestry in Sweden on a fellowship of the American-Scandinavian Foundation. There are only two of these fellowships open to foresters, and there were many applications for them. Mr. Moir was the first choice of the committee which met in Boston early in June, 1919.

The Hubert C. Williams Memorial Fund has been established by Mrs. Claire K. Williams, of Lakeville, Connecticut, in honor of her son, Hubert Coffing Williams, of the class of 1908. Lieutenant Williams died of wounds received while leading his men of the 30th Engineers in the St. Mihiel drive in September, 1918. He left an insurance fund of $10,000 which will be paid in installments over a period of twenty years. This has been turned over to Yale University as a loan fund for needy and deserving students in the School of Forestry.

PRESERVING POLES AND POSTS

TIMBER suitable for telegraph and telephone poles, fence posts, etc., is becoming scarce and expensive. It is estimated by the Forest Service that sixty years hence will witness the practical extinction of such material. At present about four million poles are being erected annually. Records show that 95 per cent of all poles are destroyed by decay, four per cent by insects and the remaining one per cent by mechanical abrasion.

Scientists who have been giving the subject attention advise, as a result of experiments conducted by them, that creosote treatment applied to the ends of the poles and posts imbedded in the ground will lengthen the life of white cedar poles 14 years; of cypress, nine years; of chestnut, four years; of pine, 13 years; of juniper, 10 years.

There are three methods of treatment adaptable to the purpose: The open tank method whereby only the butts of the poles are treated; the pressure process, used only on short poles, and the brush method which may be applied in the field as the poles are being set. The employment of the open tank method calls for the application of the treatment before the poles are shipped on the job.

As creosote and the labor required to apply it are much cheaper than new timber, it is needless to say that railroad companies, telegraph and telephone companies, farmers and all others using large quantities of timber for poles and posts are giving this matter much serious consideration. Even yet, however, entirely too many posts are being set untreated and unprotected. This is a form of business extravagance that is unwarranted.

THE AIRPLANE IN FIGHTING FOREST FIRES

AIRPLANES will go anywhere over any mountains not higher than 16,500 feet and will travel fourteen hours easily without landing, according to Colonel Hartz, addressed the annual convention of the of the U. S. Air Service, who recently Western Forestry and Conservation Association at Portland, on locating fires from airplanes, coming from Washington, D. C., in a huge Martin bombing plane.

An observer can see the forest fires from a distance, he says, and by radio he can communicate the location. His idea is that the plane remain directly over the fire until the fire-fighters arrive. It is possible to fight fires from a plane with a gas that was used by the Germans that removes the oxygen from the air. Landing places would have to be provided but this could be done even in the mountain country as the landings need not be smooth, merely on ground from which the stumps have been removed. Colonel Hartz described the method of taking mosaic maps as they are called, by a camera, of the country beneath, from the plane and he concludes that planes are a perfectly sane and safe method of traveling.

PENCIL STOCK

IN Tennessee the pencil companies are said to be replacing old fences with new woven-wire fences in order to secure the cedar rails. An investigation of woods not already used for pencils is being made by a lumber company in California, whose representatives have been in Washington and Oregon for the purpose. The juniper, the Alaska Yellow cedar, Port Orford cedar and Idaho cedar are being studied for both suitability and commercial supply. This company operates both in California and in the Tennessee red cedar district.

BOUQUETS

"The FORESTRY magazine is splendid and the work of the Association still more splendid."

DOROTHY B. BURROWS.

"AMERICAN FORESTRY is a very delightful magazine and I enjoy reading it monthly. You are certainly to be congratulated both on the appearance and subject matter."

F. A. BARTLETT,
President, Bartlett Tree Company.

"During the past year I have found your magazine more than useful in connection with my work with the Boy Scouts of America. I think that the type of nature work that you have been printing is most interesting and not later than last Sunday I was able to show to my scouts the different trails made by the animals described in your last issue."

SERENO STETSON.

"Please allow me, as an individual, private citizen, to express my sincere admiration and high appreciation of the very valuable and important work you are promoting in the development of AMERICAN FORESTRY. I am a great lover of trees and believe you will long be remembered for the great work you are doing."

J. H. VAIL,
Rochester, N. Y.

"I wish to compliment you, yes, congratulate you on the excellence of your magazine and to be identified with your organization as a member is a privilege I prize very highly indeed. . . . Right here I wish to compliment you very highly on the excellence of the illustrated articles in recent numbers."

A. F. BLOOMER,
Pasadena, Cal.

"I think the pictures of the spring wild flowers in AMERICAN FORESTRY are the most superb that I have ever seen. I am delighted with the magazine."

MRS. ANNA BOTSFORD COMSTOCK.

"My subscription to AMERICAN FORESTRY I have never regretted. Its illustrations are superb—and the book should be an inspiration to every American to take care of the trees."

CHARLES E. TEALE.

"I have enjoyed the AMERICAN FORESTRY magazine very much through the year, and am glad to be a member of the Association, as I am greatly interested in the preservation of trees, birds and wild flowers."

CLARA M. BOLTZ.

"The Forestry magazine grows better daily."

MISS IDA C. HINSHAW.

"AMERICAN FORESTRY I used to think a luxury, but I have decided it's a necessity and find it grows more interesting all the time."

MRS. A. HOWARD HINKLE.

"I never want to be without American Forestry."—H. E. Zimmerman, Chicago, Illinois.

"I am a subscriber to the magazine and have found it very interesting and helpful."

G. W. HULT,
Portland, Oregon.

"I think that the AMERICAN FORESTRY magazine is doing more among educational lines in the ways that I believe effective than all other agencies combined. I have felt for a long time that the scientific bureaus have missed the real points of attack in the literature which they issue. You seem to have caught the need of the people."

DEAN STANLEY COULTER,
Purdue University, Lafayette, Indiana.

"I am enclosing payment for my annual subscribing dues. This begins my fourth year and ever find the magazine more and more interesting."

MRS. CATHERINE HUBBARD DAVIS,
Greenwich, Connecticut.

"I am heartily in sympathy with this work. I think it is a thousand times better to plant memorial trees than to put up marble shafts. I do feel that it will be good for the children to see your excellent magazine while they are small—5 and 9, and even though girls—for the women all over the United States will soon be voting and maybe we can have as good a government as New Zealand which was told of in a late number of the *Ladies Home Journal*—but it is so full of only stories that I have discontinued it and think AMEICAN FORESTRY will be better for the children."

FRANCES G. ANDREWS.

"Permit me to congratulate you upon the methods pursued by your organization and upon the effective type of literature and publicity which you are using. This office receives a constant flood of communications and printed matter from organizations of almost every description, hence my opportunity for comparison is, perhaps, unusually fortunate. Under the methods pursued, the appeal of your organization is almost irresistible. I am glad this is true because I am in sympathy with your work."

MRS. BURRITT HAMILTON,
President, Michigan State Federation of Women's Clubs.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

HOYT'S ANTISEPTIC TREE VARNISH

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SALE OF TIMBER, KLAMATH INDIAN RESERVATION
CHILOQUIN UNIT

SEALED bids in duplicate, marked outside "Bid, Chiloquin Timber Unit" and addressed to Superintendent, Klamath Indian School, Klamath Agency, Oregon, will be received until twelve o'clock noon, Pacific Time, Thursday, April 15, 1920, for the purchase of timber on a tract, in townmanship 35 and 36 south, ranges 7 and 8 east of Willamette Meridian in Klamath Indian Reservation, lying south of the Sprague River. The said unit includes about 10,000 acres of unallotted land with an estimated stand of one hundred sixty million feet as to which contract will be made with the Superintendent and about three thousand acres of allotted lands with an estimated stand of forty million feet as to which separate approved contracts with the Indian owners may probably be made. More than ninety per cent. of the timber within the unit is western yellow pine and the remainder is sugar pine, incense cedar, and red and white fir. Each bid must state the price per thousand feet Scribner Decimal C. Log scale that will be paid for timber cut and scaled prior to April 1, 1924. Prices subsequent to that date are to be fixed by the Commissioner of Indian affairs by three year periods No bid of less than three dollars and fifty cents ($3.50) per M. feet for yellow pine, sugar pine and incense cedar, and one dollar and fifty cents ($1.50) for other species during the period ending March 31, 1924 will be considered Each bid must be accompanied by a certified check on a solvent national bank, payable to the Superintendent of the Klamath Indian School, in the amount of Twenty Thousand Dollars ($20,000.00). The deposit will be returned if the bid is rejected but retained as liquidated damages if the required contract and bond are not executed and presented for approval within sixty days from the acceptance of a bid. The right to reject any and all bids is reserved. Copies of the bid and contract forms and other information may be obtained from the superintendent, Indian School, Klamath Agency, Oregon.

Washington, D. C., January 21, 1920. CATO SELLS, Commissioner of Indian Affairs.

"We are never too busy to read your admirable magazine, AMERICAN FORESTRY."
C. H. PEARSON,
New York City.

"I am very glad to accept membership in the American Forestry Association and I shall do all that I can to promote an interest in forestry work. This end of our state is now awake to the need of it. I feel that this work is most important educationally."
ORTON LOWE.

"I have just received the last number of AMERICAN FORESTRY and I am delighted with it."
R. A. BULLOCK,
Boston, Mass.

"I think that your plan to get out a technical edition is excellent, and I shall be glad to receive it. Since my father takes the regular edition, this will enable me to see both, and I should not like to miss the usual number even with a technical edition in place of it."
PHILIP T. COOLIDGE,
Watertown, Mass.

"I wish to congratulate you upon the happy solution of the problem of a popular magazine on technical forestry subjects suitable for the professional members and a magazine which deals with the popular side of forestry and related subjects."
F. W. BESLEY,
State Forester of Maryland,
Baltimore, Md.

"I always greatly enjoy the Association's magazine and look forward to its coming. I know of no more interesting problems than those of our forests and none which the public more needs than the kind of enlightenment which the Association gives."
MISS FAY INGALLS,
Oyster Bay, N. Y.

"The AMERICAN FORESTRY magazine is beautiful, useful, and interesting—dealing with a subject all important."
DAVID B. BIRD,
Chicago, Ill.

"I am very much interested in the Foresters Edition and wish to congratulate you upon the excellency of the subject matter. I wish it were possible for you to get out these editions often. It seems to me that the present is a critical time in the forestry movement and that we have a great deal to gain or lose in the immediate future. There certainly is no better agency than AMERICAN FORESTRY to disseminate the right kind of information for the forestry interests of the country."
EDMUND SECREST,
State Forester of Ohio.

"The Foresters Edition of the AMERICAN FORESTRY was a very interesting number to me.
R. C. JONES,
State Forester of Virginia.

STOP THE DECAY OF TREES

WHENEVER the limb of a tree is blown off or becomes diseased, the stump should be sawed off even and painted with creosote or tar paint; otherwise decay will set in and spread to other parts of the tree.

Oftentimes even a nail hole will so injure the bark that it will come off leaving the wood underneath unprotected. If these spots are left bare, decay will set in and seriously endanger the tree. A coat of creosote or tar paint will prevent spread of decay and gradually the bark will grow over the bare place again.

BIG PECAN GROVE

THE possibilities of pecans in Texas have scarcely yet been realized, and the remarkable progress being made is proving astonishing to many old-timers. Some of the pecans brought to the Extension Service, A. and M. College of Texas by J. A. Evans, the pecan specialist, as samples of the nuts gathered from trees under his care are indeed excellent specimens, and efforts are under way to make arrangements for grading and classifying pecans so that producers of excellent varieties may reap a just reward for their labors.

The owners of the old Turner farm near Irwin, Texas, which Mr. Evans visited a few days ago for the purpose of giving advice regarding the advisability of growing pecans and incidentally fruits and berries, evidently see great possibilities in pecan production, since it has been decided to establish a big pecan grove at this place. Mr. Evans reported that he found one hundred acres well adapted to pecans and berries, but that there was no clay subsoil for peaches.

KILL PREDATORY ANIMALS AND PROTECT GAME.

BEN LILLY, who has killed 190 mountain lions in the last seven years, and is probably the greatest living lion-hunter, has reached the conclusion, after years spent on the trail of this beast, that where deer are plentiful, an average of 100 per year are killed by each adult lion. "In the spring," says Mr. Lilly, "a mother lion with young will kill a fawn or a calf every day." He believes that the great question in game protection is to kill off the predatory animals. Judged by practical results, Mr. Lilly is one of the most successful game protectionists in America.

MUNICIPALITY OPERATES SAWMILL

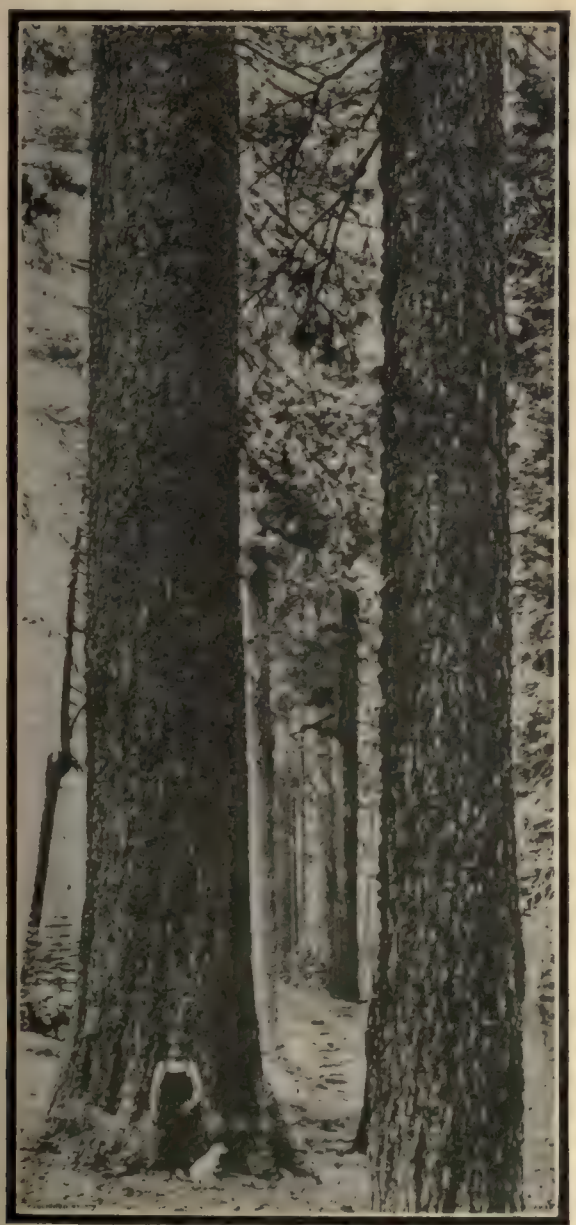
PROBABLY the only city in California to operate a mill for the production of lumber for its own use is San Francisco. Its mill, at Groveland, south of Sonora, Tuloumne County, now is in operation. One hundred men are employed. (*The Timberman*, June, 1919.)

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PERCIVAL SHELDON RIDSDALE, Editor

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Photograph by courtesy Mr. Frederic M. Fogg.

MINNEHAHA FALLS, MINNEAPOLIS, MINNESOTA

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EDITORIAL

A DECADE OF PROGRESS IN THE FOREST SERVICE

THE retirement of Colonel Henry S. Graves as head of the Forest Service is a fitting occasion to review the progress which has been made during the ten years in which he has so admirably directed the forest activities of the National Government. It is a decade during which the Forest Service has settled into its stride. Prior to 1910, its efforts of necessity were concentrated largely upon the creation of the National Forests as a first step in conservation, upon building a secure foundation under them in public support, and upon blocking out the main lines for their development toward the maximum national service. Colonel Graves' administration, in its development of business methods, enlarged usefulness, and the application of technical forestry to management problems, may be summed up as a transformation of forest reserves into permanent National Forests.

During this period the gigantic task of classifying the lands embraced in the National Forests has been nearly completed. Large areas of agricultural land have been segregated and opened to settlement, insuring the permanent use of the remaining land for forest production as a public enterprise. A comprehensive policy for developing the National Forests by road building has been entered upon and carried forward, with the recognition and support of Congress through appropriations totaling $19,000,000. The last ten years have brought several seasons of exceptional and extreme fire hazard and have given the Forest Service a task in organized fire protection not paralleled in the history of the world. The emphasis given to the development of fire protection organization and methods and the unremitting study devoted to every phase of this great problem represent today one of the greatest assets not only of the Forest Service, but of the United States, with the increasing recognition of the vital importance of stopping forest losses from fire.

The use of the National Forests by the public has been vastly increased. The number of timber sales has much more than doubled and now exceeds 12,500 sales annually. The yearly cut of timber has nearly doubled. There has been a material increase in the use of the forage on the National Forests, a use now shared by nearly 40,000 farmers and stock-growers. The annual receipts from the National Forests have more than doubled and are now close to four and one-quarter million dollars. Not alone, however, in their economic phases has the value of the National Forests as a public enterprise been demonstarted. The thousands of summer homes and camps now occupied and enjoyed every year and the hundreds of thousands of campers and visitors who flock to the National Forests testify to the enormous public value of these national holdings as a source of health and recreation to the people.

One of the most significant and forward-looking steps which has been taken and for which the American Forestry Association may fairly claim a measure of credit is the enactment of the Weeks Act, under which it has been possible to extend the National Forests into the Eastern States and make a large advance in the protection of the watersheds of important navigable streams. The purchase of nearly two million acres of mountain forests has been completed by the National Forest Reservation Commission and these areas are today under administration as National Forests, with all their varied forms of public service. Under the same law a definite policy has been inaugurated of Federal co-operation with the States in the protection of forested watersheds from fire which

COLONEL GRAVES RESIGNS

On March 8 announcement was made that, after ten years of service as Chief Forester of the United States Department of Agriculture, Colonel Henry S. Graves had notified the Secretary of Agriculture that he intends to ask to be relieved of his position. He expects to leave the service about May 1.

"Since the pecuniary returns afforded professional and scientific men in the Government service inadequately provide against the exhaustion of the working powers which must inevitably take place in time, and entail sacrifices from which employment elsewhere is free," Colonel Graves wrote, "the only course consistent alike with self-respect and a regard for the public interests seems to me to be retirement from office before efficiency has been impaired. Present conditions, which amount to a heavy reduction in the rate of compensation in practically every branch of the Government service, emphasizes this point of view."

Resignation of Albert F. Potter as Associate Chief of the Forest Service was also announced. Mr. Potter, in asking that his resignation be made effective on April 15, says he feels that "the time has now arrived when I should retire from the Government service and give my attention to private interests."

has had a far-reaching influence in stimulating forest protection in almost every section of the United States and which, under its logical and necessary development, should go a long way toward the solution of our national forestry problems.

The past decade has also witnessed significant advances in forest research. One of the first acts of Colonel Graves upon assuming his duties was to formally open the Forest Products Laboratory, at Madison, Wisconsin. In ten years' time the usefulness of this institution in almost every phase of the utilization of forest products has been completely demonstrated. Research in silviculture and technical forest practice has kept pace. A series of forest experiment stations located in several important forest regions of the West are steadily building up the science of American silviculture. The technical study of forage resources in the National Forests, which was begun in 1907, has been carried forward on an extended scale. This study is not only furnishing the data necessary for the most effective use of the stock ranges in the National Forests, but is furnishing the information on which the whole livestock industry of the Western States can utilize their grazing lands in a farsighted way which will make them increasingly productive. It is doing for the forage resources of the West essentially what other branches of the Service are doing for its timber resources. During the severe depression and uncertainty prevailing in the lumber industry for a period of several years, the Forest Service took off its coat and made a thorough study of the whole situation, by means of which it was possible for the first time to present to the country in a comprehensive way the fundamental facts in our forest economics which underlie many pending problems. During the past year, Colonel Graves himself has put before the country a clear statement of what these problems are and has inaugurated a new movement for national action to put a stop to forest devastation.

The war brought many acute problems to the Forest Service. A large number of men enlisted for forestry operations in France, whose preliminary organization was carried out by Colonel Graves in person. At the same time it was possible to maintain the essential administrative activities on the National Forests unimpaired and to aid the Government in many vital problems related to war supplies of forest products.

In the past decade, much of the old opposition to the National Forests has disappeared with the steadily increasing recognition of their local and national usefulness and of the soundness of their principles of administration. Nevertheless, the Forest Service has been confronted with many difficulties. It has been unable to extend its work along many needed lines, notwithstanding their obvious public benefit. Colonel Graves has had a hard fight to maintain the spirit and effectivness of his organization in the face of these difficulties. The standing of the Forest Service today and the recognition of the value of its many lines of work are sufficient proof that he has succeeded. But it rests upon all of us who believe in forests as a vital thing in our national life and economy to see to it that the work of the organization which he has so ably led goes on with the public support which it merits.

BACK UP OUR PUBLIC SERVICE

THE resignation of the Chief of the Forest Service may well make all good citizens pause to consider whither we are driving in respect to our public service. Colonel Graves is not dropping the work which he has directed so ably for the past ten years to accept a more remunerative position. It is evident that the principal reason for his action is to protest against the difficulties and handicaps placed upon the maintenance of an efficient public service by the Government itself.

The Forest Service is simply a striking illustration of the general condition. It was created not many years ago, imbued with the high ideals of public service inspired by President Roosevelt and Gifford Pinchot. It has always carried before it a high standard of efficiency and the vision of a constantly widening field of usefulness; and it has sought to make them real and vital things in the daily work of its members down to the summer guard on his lookout peak. It has accomplished a prodigious task and met many crises successfully because of the conception of public service which drove it forward. But to maintain its efficiency as a business organization and its driving power has steadily become more difficult because of the failure of the Government to recognize the importance and responsibility of its work and to provide adequately for its needs. No machine can run indefinitely on its initial momentum; and human machines demand, above all things, encouragement and recognition. The Forest Service is a human machine, whose needs and interests Colonel Graves has carried close to his heart. Because he has been unable adequately to provide for these needs, because he sees clearly that the efficiency of his organization and its capacity for public service are at stake, he has taken the only means open to him to protest against the Governmental indifference which is responsible.

A few facts show how serious has become the problem of "turn-over" in personnel in the Forest Service. During the fourteen months prior to last September this organization lost 28 per cent of its men, including 18 forest supervisors and 214 forest rangers. Out of six logging engineers, four resigned for outside employment. In the vast majority of these cases the sole reason was economic necessity. Many of these men have obtained in outside employment two or three times the remuneration received for Government work. The process is still going on, with additional men quitting every month. Since December 1, six officers occupying responsible positions have resigned in a single district. A large

number of men have held on solely through loyalty to the organization and faith that their situation would be remedied.

No organization, particularly one whose work requires such a degree of expertness, can continue long on this road without a crippling of its efficiency. Aside from the actual losses in personnel, effective service cannot be rendered by men who are unsettled in mind, who are finding increasing difficulty in making ends meet, and who are constantly facing the necessity of dropping their chosen work in order to provide adequately for their families. And the same reasons which are compelling men to leave prevent recruiting the Service with new employes of adequate qualifications.

The legislator in Congress may not see the connection between the resignation of an experienced forest supervisor or forest ranger and an emergency expenditure of thousands of dollars to stop a disastrous forest fire. But the connection is there. The loss of experienced men cannot but have a vital bearing upon the efficiency of the whole organization, not only in stopping fires but in all activities, not the least of which is giving good service to the users of the National Forests. Furthermore, efficiency and morale go together. Cripple the first and a break in the second is sure to follow.

No one has realized this situation better than Colonel Graves. He has been combatting it with every means at his command. He has gotten the first-hand story of scores of his own forest officers in the field; and he tells us that he marvels that the Forest Service has hung together as long as it has. The very modest relief granted by the appropriation committees in Congress this winter is very far from adequate. Colonel Graves has gone as far as he can, and he now in effect puts the question up to the American public.

The situation of the Forest Service, let it be repeated, is but typical of our entire technical public service. The question is up to the people of the United States. Following the war, with the increase in Government activities growing out of it, the efficiency and ideals of our public service are of more vital concern to the United States than ever before. Work cannot be well done unless it is well remunerated. Particularly, specialized and technical work cannot be well done unless the men and women doing it are encouraged by the conditions of their employment and the opportunities for advancement to put their very best into it. The right attitude of the people and Government of the United States toward their public services is one of the most urgent questions before us today.

COLONEL W. B. GREELEY THE NEW FORESTER

Colonel W. B. Greeley was on March 14 appointed Chief Forester of the United States to succeed Colonel Henry S. Graves, and Secretary Meredith's selection will be heartily approved by foresters throughout the country. Colonel Greeley has long been classed as one of the most able men in the Forest Service. Not only is he a thoroughly trained forester, but he has unusual administrative ability, an asset which, combined with his faculty for getting practical results, is certain to make his administration successful.

Colonel Greeley is from California, a graduate of the University of California and the Yale Forest School, and has been in the Forest Service continuously since 1904, except for two years of military service with the American Expeditionary Forces. In the Forest Service he has had long and varied administrative experience. He has been advanced through all the technical grades from the lowest to his present position as Assistant Forester. His first assignment was in the Southern Appalachians. From 1906 to 1908 he was Supervisor of the Sequoia National Forest in California. After a short period of service in the Washington office he was appointed District Forester in charge of the National Forests of Montana and Northern Idaho, with headquarters at Missoula, Montana. In this position it fell to him to protect these forests, having a total area of over 29,000,000 acres at the time of the great fires in 1910. The following year he was appointed Assistant Forester and placed in charge of the Branch of Silviculture, now the Branch of Forest Management, in the Washington office. This branch has supervision of all National Forest timber sales and timber cutting, together with other important lines of work.

With the opening of the war it was decided to raise and send to France forestry troops, and their recruiting was assigned to Colonel Greeley. To prepare the way for their operations in the French forests, the Chief Forester, Colonel Graves, was sent to France and attached to the Central Staff. One of his first steps was to send for Colonel Greeley to aid in the work. After Colonel Graves returned to the United States Colonel Greeley took his place and finally became chief of the Forestry Section in the American Expeditionary Forces, in charge of 21,000 forestry troops and 95 sawmills, with lumbering operations scattered from the zone of military operations to the Pyrenees and from the Swiss border to the Atlantic. He was awarded a decoration by the French, in recognition of his war service, as a Chevalier of the Legion of Honor, and by the English as member of the Distinguished Order of Great Britain. Last July, after nearly two years of foreign service, he was brought back to the United States, and in October resumed his old position in the Forest Service, but retaining a commission as Lieutenant Colonel in the Engineer Officers' Reserve Corps. He is a fellow of the Society of American Foresters, a director of the American Forestry Association, and an author of various publications and papers on forestry subjects. His high professional standing, broad training and experience and demonstrated capacity as an executive cause him to be regarded as undoubtedly the best man in the country for the position of Chief Forester.

"I consider," said Secretary Meredith in announcing his selection, "that the department is fortunate in having available a man so well qualified to fill an exceptionally difficult and responsible position, and I am convinced that the public interests in forestry will be in good hands with Colonel Greely at the head of our Forest Service."

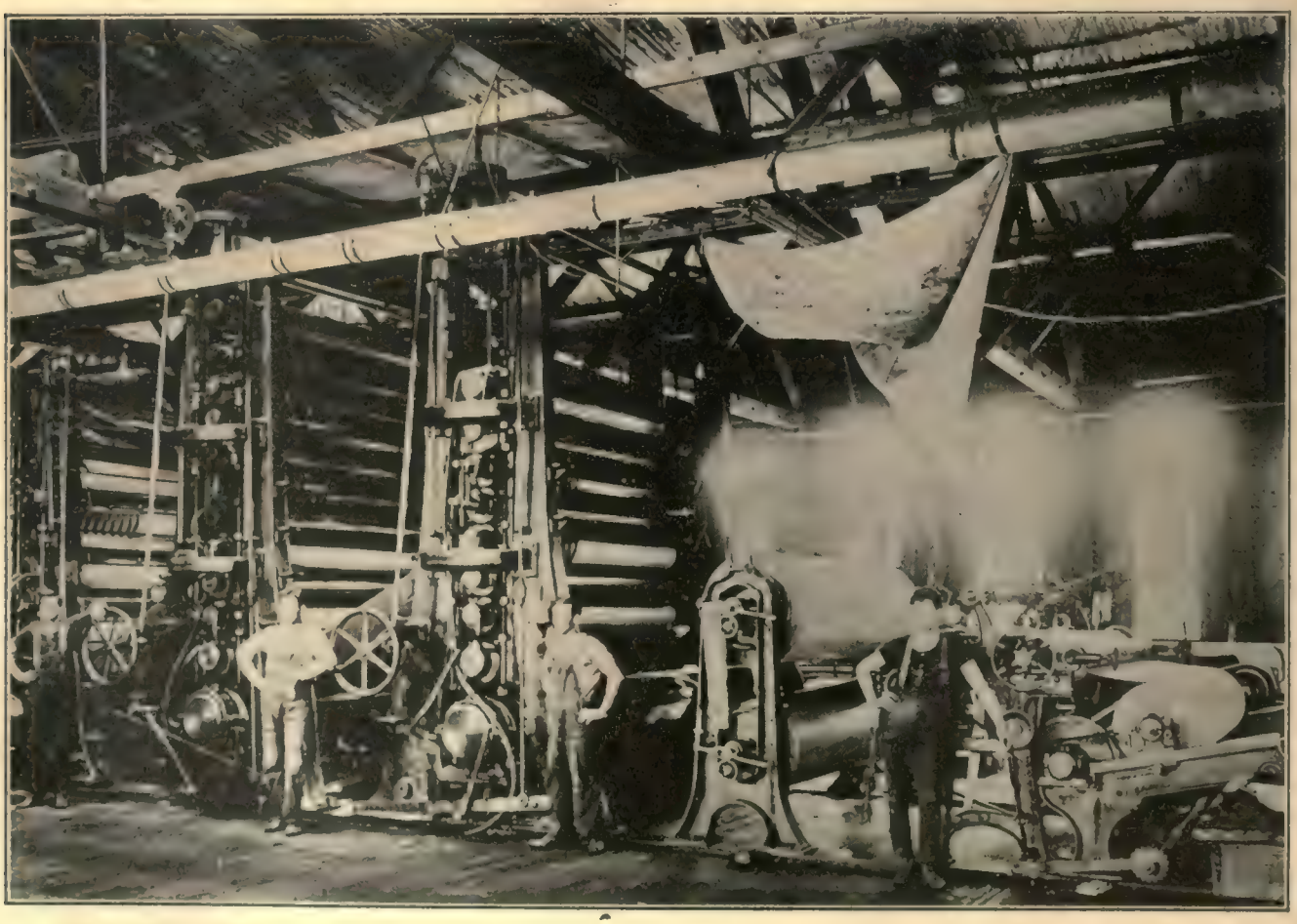
RAW MATERIAL FOR THE PAPER INDUSTRY

BY A. F. HAWES, FOREST SERVICE

DURING the war period the forests were levied upon for numerous products, such as lumber and timbers for cantonments and ships, wood for use in airplanes and rifle stocks, and material for the manufacture of distillates and tanning extracts. In this way the forests of the United States were of material assistance in the winning of the war which was fought by the Allies in the name of democracy. The forests have an equally important part in the peaceful work of making democracy safe for the world, for the ultimate solution of all our problems must come through education, and the printed page is one of the most powerful educational agencies.

The present paper shortage is probably the result of the unusual amount of advertising carried by the newspapers rather than of any scarcity of wood, but it has impressed upon the country the importance of maintaining an adequate supply of paper, and this, in the last resort, means providing a permanent supply of wood. Substitutes are being found for lumber and, consequently, the per capita consumption of it has somewhat declined, but wood is still the cheapest of all paper-making materials. The per capita production of paper in the United States has increased since 1880 from 18 to 118 pounds, and by far the largest proportion of paper is made from wood. The better grades of paper are still made from rags, as they were before wood was used for the manufacture of paper. While paper can be made from various plant fibers, straws and certain other substances, still the collection of these materials in bulk is so costly that none of them can compete with wood, and there seems to be no prospect of anything taking the place of wood for the production of newsprint and the other cheaper grades of paper. Of the 6,000,000 tons of paper made in the United States in 1916, three-sevenths was used for printing, one-fourth for boxing, one-seventh for wrapping, one-eighth for writing and typewriting, and the remainder for miscellaneous uses, including building and wall papers.

There are four processes of making wood pulp—the mechanical process, by which wood is ground under great pressure by grindstones, and three chemical processes known as the sulphite, soda and sulphate methods. By the chemical processes wood chips are cooked in a liquor in immense digesters for a period of several hours. By the mechanical process the wood



THE SUPERCALENDER, SLITTING AND REWINDING PART OF A PAPER-MAKING MACHINE. THE PAPER PASSES THROUGH FROM THE LEFT

fibers are torn and broken, and, therefore, a paper made wholly from ground pulp would lack strength. By the chemical processes the entire fibers are separated by the dissolving of the connecting lignin. For this reason chemical pulp is added to ground pulp to give strength to the paper. As the expense of making chemical pulp is about twice that of making ground pulp, the smallest possible amount is employed for the cheaper kinds of paper such as those used for newspapers and catalogues. This difference in cost is due partly to the fact that it requires about two cords of peeled wood to produce one ton of chemical pulp, as against one cord to make one ton of ground pulp, and partly to the fact that the cost of chemicals used in those processes is considerable and the plant involved is more expensive. In some newsprint papers as much as 85 per cent of ground pulp is used. The chief essentials for the location and operation of a ground-pulp mill are a plentiful supply of wood and good water power. For a sulphite mill, wood, sulphur, lime or limestone, and coal are required. Most of the sulphur, however, used even in the Northern mills, comes from Louisiana.



A PILE OF SPRUCE AND FIR LOGS TO BE MADE INTO NEWSPRINT PAPER

Newsprint paper must be cheap, reasonably strong and light-colored; and, as the sulphite process is the only one of the chemical processes which produces a light-colored paper, newsprint is made entirely from ground and sulphite pulp. Papers made by other methods could, of course, be bleached, but the expense of this process would make it impracticable. Under methods so far developed the resinous woods, such as the Southern pines, cannot be used by the ground or sulphite methods, and the short-fibered woods, such as poplar, are not strong enough for newsprint. This class of paper is, therefore, made entirely from such non-resinous woods as the spruces, firs and hemlocks. On a basis of 80 per cent of ground pulp, it requires about 1.5 cords of wood to produce one ton of newsprint paper, and the cost of the wood amounts to from 30 to 40 per cent of the cost of the paper.

The soda and sulphate processes produce a dark-colored paper. The latter is a comparatively new process and may eventually take the place of the former, since it produces a stronger paper known as "kraft." From such long-fibered wood as that of the Southern pines a very strong paper is produced, which is used largely for wrapping purposes. The soda pulp is too soft for the manufacture of wrapping paper. This process employs chiefly such woods as poplar, basswood, gum, beech, birch, maple and chestnut. When the soda pulp is bleached, as nearly all of it is, it is used in making paper for books and magazines.

From the above it will be seen that most of our woods may be used for paper making by one process or another, but some are much better suited than others by reason of their long fibers, their freedom from resin, or their occurrence in large quantities. In 1918 the production of wood pulp in the United States was 3,313,861 tons, a decrease of 6 per cent from 1917. Of this amount 41 per cent was mechanical pulp, 44 per cent sulphite, 11 per cent soda and 4 per cent sulphate. The consumption of cordwood by 250 establishments was 5,250,794 cords, of which about 744,518 cords were imported. These startling figures naturally suggest the inquiry whether our forests can continue to furnish such a vast amount of wood indefinitely. The following table shows the amount of pulpwood consumed in the United States in 1918:

Table I.—Pulpwood consumption, 1918. Quantity of wood consumed, by kinds, with percentages of distribution.*

Kind of Wood.	Quantity, Cords.	Distribution, Per Cent.
Spruce—Domestic	2,204,143	42.0
Imported	666,164	12.7
Hemlock	836,406	15.9
Balsam fir	368,117	7.0
Poplar—Domestic	210,849	4.0
Imported	78,354	1.5
Jack pine	152,124	2.9
Yellow pine	133,774	2.5
Yellow poplar	61,247	1.2
Tamarack	52,031	1.0
Gum	47,145	.9
White fir	35,119	.7
Cottonwood	18,685	.4
Basswood	12,110	.2
White pine	10,183	.2
Beech, birch, maple and chestnut	202,930	3.9
All other species	6,810	.1
Slabs and other mill waste	154,603	2.9
Total	5,250,794	100.0

* Pulpwood Consumption and Wood Pulp Production, 1918," by Franklin H. Smith, Forest Service, United States Department of Agriculture, in co-operation with the Newsprint Service Bureau.

From the above table it will be seen that spruce, hemlock, fir and poplar are the only varieties of which appreciable quantities are used. If white fir and cottonwood are included, these varieties comprise nearly 85 per cent of the wood used for pulp. So far as the yellow pines and hardwoods are concerned, all of which are used in small amounts, we may assume that the supply is ample unless the demand for them is very much increased. There are no accurate estimates of the stands of any of the varieties of trees, but the opinions of many foresters and other authorities have been collected and carefully weighed. From the best information obtainable in this way it is estimated that there are about 25,000,000 cords of poplar in the strip of States from Maine to Minnesota, inclusive. At the present rate of consumption, therefore, there is no danger of a shortage of this species, since it grows rapidly and is probably increasing faster than it is being cut.

The most serious problem is connected with our supplies of newsprint woods—spruce, hemlock and fir. The consumption of these woods by regions is shown in Table II:

Table II.—Native pulpwood consumption. Quantity of wood consumed by kinds and States, 1918.

Species.	New England States and New York, Cords.	Lake States, Cords.	Pa., Md., Va., W. Va., N. C., Cords.	Cal., Ore. and Wash., Cords.
Spruce.....	1,527,001	470,346	171,411	35,385
Hemlock.....	87,326	526,831	76,666	145,583
Fir.....	272,537	88,580	7,000	35,119
	1,886,864	1,085,757	255,077	216,087

In any consideration of the pulpwood supplies we must remember that large quantities of these species are required for lumber as well as for pulpwood. Table III shows the amount of spruce, hemlock and fir used in 1917 for lumber:

Table III.—Amount of spruce, hemlock and fir lumber manufactured in 1917, by regions.

Region.	Feet B. M.
New England States and New York.....	687,746,000
Lake States.....	972,168,000
Pennsylvania, Virginia, West Virginia and North Carolina	607,256,000
Alaska, Washington, Oregon and California.....	1,001,233,000
Total.....	3,268,403,000

In order to add this amount to the amount used for pulpwood it is necessary to convert the board feet to cords. For this purpose it is assumed that 1,000 board feet are equivalent to two cords. As stated above, there are no accurate estimates of the amount of standing timber, but Table IV gives the concensus of opinion of the best experts with respect to these three species, together with the total amount of these species used for lumber and pulpwood, estimated and expressed in cords:

Table IV.—Approximate stand of spruce, hemlock and fir, total annual consumption of these woods, and the number of years the supply would last at the present rate of consumption.

Region	Approximate stand, Cords.	Approximate annual cut of lumber and wood, Cords.	Approximate number of years the present supply maybe expected to last at present rate of cutting.
New England States and New York...	78,000,000	3,262,000	23
Lake States....	56,000,000	3,030,000	18
Pennsylvania, Maryland, Virginia and North Carolina.....	15,000,000	1,470,000	10
Alaska, Washington, Oregon, California. Idaho, Montana.....	540,000,000	2,218,000	243
Total for United States.....	689,000,000	9,980,000	
Average.....			69

At first glance it might seem that a national supply for 69 years makes it unnecessary to worry over this question for some time to come. When we realize, however, that 95 per cent of the pulp and paper mills are located in the East and that the present supplies of spruce, hemlock and fir in this part of the country cannot be expected to last more than 25 years, the importance of the problem is apparent. A pulp and paper mill is a very expensive establishment, usually representing an investment of several million dollars. It cannot be picked up and moved to another section of the country. On the other hand, wood cannot be economically shipped great distances. Even now some of the pulp mills are bringing it more than 300 miles. During the past few years the seriousness of this diminishing supply of wood available for the use of the Eastern mills has been reflected in constantly increasing importations of paper and pulp from Canada.

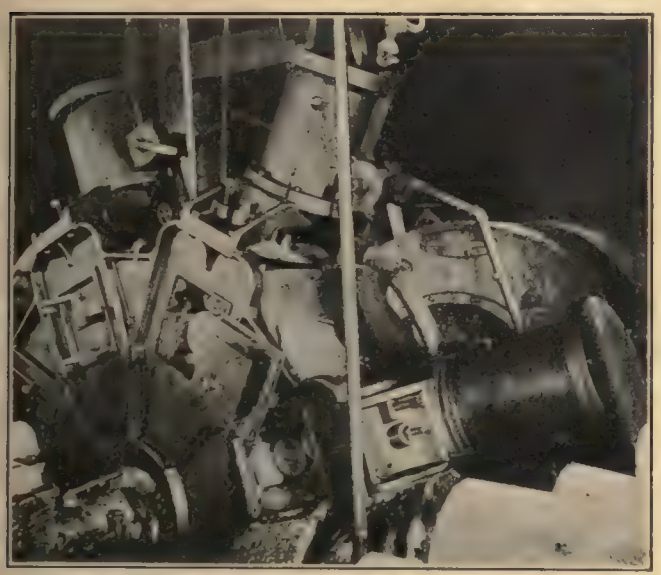
Up to 1909 the country was self-supporting in respect to pulpwood, but since that date the consumption has exceeded the home production. Production continued to increase up to 1915, but since then has fallen off, and the importations from Canada are now constantly increasing.

Several ways of meeting this impending pulpwood crisis suggest themselves. We may rely still further upon Canadian resources, but this will mean the abandonment of many of our mills and the gradual shifting of the paper industry to foreign soil. This might be a source of serious embarrassment under certain conditions, although friendly relations with Canada are not likely to be disturbed. The Canadian Government has wisely, from its standpoint, prohibited the exportation of pulpwood from Crown lands, thus fostering the manufacture of paper in that country. Canada now has altogether 90 pulp and paper mills, which produce a total of about 2,100 tons of paper a day, and 89 per cent of this quantity is available for export, a large part of it going to the United States. In fact, of the paper, wood and pulp used annually in the United States, about one-

third comes from Canada, and the Canadian supplies are by no means inexhaustible.

As the figures in Table IV show, there are ample supplies of pulpwood for a great many years in Alaska and the Northwest, but, unfortunately, only about 5 per cent of the mills are located there. From a national standpoint, of course, making the paper in the United States would be better than importing it from Canada; but, as long as the publishers can obtain Canadian paper more cheaply than they can get paper from the West, they will naturally buy from Canada. There are, however, several factors that will gradually bring Western paper into competition with the Eastern product:

(1) There are great quantities of wood available in the West at stumpage prices of 25 cents to $1.50 per cord,



A GRINDER SUCH AS THIS WILL MAKE 6 TONS OF GROUND PULP A DAY, REQUIRING ABOUT 6 CORDS OF WOOD. A 200-TON PLANT REQUIRES 33 OF THESE GRINDERS AND A LARGE WATER POWER.

as compared with $2.50 to $5 per cord in the Northeast.

(2) Much of this wood is on the National Forests and is, therefore, available without the carrying charges that must be figured against large investments in land.

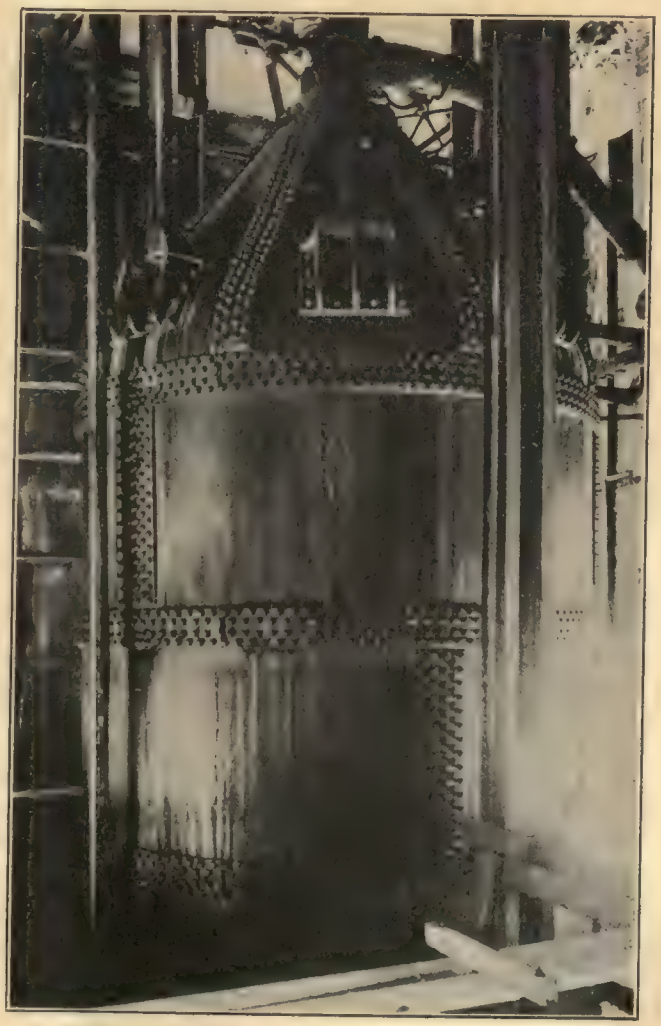
(3) The yield per acre of the forests is much greater than that of the Eastern Canadian forests, and, consequently, smaller areas are sufficient to produce a given amount of pulpwood at a reduced cost of production. The average value of Canadian wood in 1915 was $6.71 a cord, as compared with $8.76, the value of pulpwood in the Eastern United States in 1916. During the war the price paid by some of the Eastern mills was as high as $22 per cord. One of the mills on the Columbia River paid in 1916 an average of $4.82 for white fir, $5.32 for hemlock and $4.36 for Sitka spruce.

(4) There are large water powers available in the West.

Partly offsetting these advantages are the higher cost of wages in the West and the high freight charges to the points of consumption, as most of the publishing is done in the East. Until recently Western paper competed with the Eastern product only as far east as Denver and Salt Lake; but, with the present high prices of paper a small amount of Western paper has found its way into the Eastern market. Western lumber is already competing with Eastern lumber, with the result that much good spruce which should be cut into lumber is going into pulp.

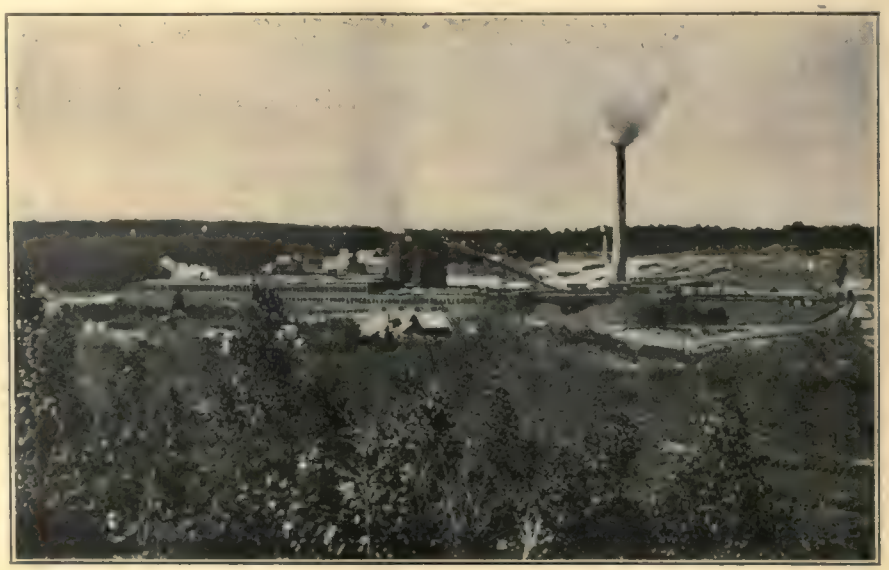
Both of the measures mentioned above, importations from Canada and increased production in the West, are temporary expedients. In the long run, the country must solve the paper problem on the basis of a permanent wood supply. There are two ways of helping to accomplish this, and they require a constructive national policy: (1) The utilization of mill waste for paper making, and (2) the regeneration of our forests on a more productive basis.

Sawdust may be made into pulp, but not economically. On the other hand, mill waste, including slabs and edgings, is well adapted for paper making by the sulphite process. At present only about 3 per cent of the wood used for pulp is mill waste, and this is evidently a very small portion of all the slabs and edgings from the spruce, fir and hemlock that is now being made into lumber. For every thousand feet of lumber manufactured there is a waste of about one-half cord of slabs at



A DIGESTER SUCH AS THIS WILL MAKE ABOUT 15 TONS OF SULPHITE PULP AT A COOK, OR 30 TONS A DAY. SIXTY CORDS OF WOOD CHIPS ARE REQUIRED TO MAKE 30 TONS OF CHEMICAL PULP.

the mill. In the manufacture of spruce, fir and hemlock lumber there must, therefore, be an annual waste of about 1,600,000 cords, much of which is burned in incinerators, The objection on the part of capitalists to building plants to run on mill waste is that lumber operations in any one locality cannot guarantee through a continued period of years a steady supply of wood waste sufficient to justify the large investment required for a sulphite mill. This is an important argument for putting the lumber industry on a permanent basis, and it is quite probable that the saw mill of the future may be run as an adjunct to the pulp mill, the better classes of logs being sawed, and the poorer logs and mill waste being used for pulp. An arrangement of this kind would also save a large amount of wood now left by lumbermen in the forest in the form of tops, and crooked and defective logs, which are well suited for pulp but in some sections are not considered merchantable for lumber. The regeneration of the forests on a more productive basis is the most important measure for perpetuating the paper industry in the United States. In the past, forests have been cut, and little provision has been made for future growth. In the future, operations should be conducted in such a way as to secure an increasing reproduction of species valuable for lumber and pulp. Fortunately, such species as fir and poplar are prolific seeders and may, without difficulty, be reproduced naturally. Spruce may be reproduced under proper methods of forest management, though with more difficulty than is experienced in the case of the two species just mentioned. As the cost of pulpwood increases, investments in plantations, especially in the neighborhood of pulp mills, will commend themselves. The production of large quantities of wood near the mills will greatly reduce the cost of lumbering and of transportation, as compared with the expense of operating remote tracts that furnish a low yield of wood. Young, thrifty-growing forests will produce yields scarcely imagined by one who has been accustomed to deal exclusively with old timber.



A TYPICAL PULP AND PAPER MILL

Although some experiments in forestry by a few pulp companies have been made on a small scale, no adequate steps have been taken by the industry to perpetuate the supplies of wood. Furthermore, no great anxiety seems to exist about the future, although the scrapping of millions of dollars' worth of plants within a period of 10 or 20 years may be entailed.

An expert who recently returned from Sweden, where he had investigated the paper business for the Wrapping Paper Manufacturers' Service Bureau, states in his report that every sulphite mill which owns timber limits has a most important branch known as the forestry department. These mills employ technically trained foresters, prepare very accurate figures in regard to the yearly growth of their forests, and cut no more timber than grows each year. Any wood used in excess of this yield is purchased from Government limits and privately owned tracts. The idea is not new, but it makes clear the desirability of larger holdings in Northeastern United States to be owned, some of them, by the pulp and paper industry, and others by the National and State Governments, and all managed upon this principle of limiting the cut to the amount of the annual growth. In this connection it is encouraging to note that the American Paper and Pulp Association has recently issued a pamphlet entitled "Suggestions for a National Forest Policy with Special Reference to the Pulp and Paper Industry," in which public acquisition of forest lands and more efficient fire prevention are especially advocated.

But it is to the wood-using industries rather than to the lumber companies that we must look for any serious efforts toward the perpetuation of the national lumber supply. In the same way, it is the publishers rather than the pulp companies who must take it upon themselves to see that our national pulp supplies are perpetuated. The newspapers of the country have not always been far-sighted enough to advocate forestry practice as being for the public welfare. They must soon see that it is essential for the perpetuation of their own industry as well as for the good of the Nation as a whole. One of the first steps in this direction should be the making of an accurate census of the timber in the country suitable for use as pulpwood; for, as has been stated above, only rough guesses are at present available. Such a survey would show that definite regions are available for the development of the pulp and paper industry and what detailed measures should be taken to perpetuate the forests.

PRIVATE FORESTRY IN FRANCE

BY W. B. GREELEY

FORMERLY LIEUTENANT COLONEL 20TH ENGINEERS

IT was a lumberjack sergeant of the 20th Engineers who remarked that the lumber business in France seemed to be concerned more with growing trees than cutting them into boards. That in a nutshell is the difference between the timberland owner in France and the timber baron of America. The conception of a forest as land producing crop after crop of wood extends from the intensively managed public forests of France down to the peasant who owns half a hectare of poplars in a swampy bottom.

To us in the United States, who are wont to think of forestry as possible only for the nation or state, it is of interest to know that two-thirds of the wonderfully conserved forests of France are owned by private citizens. The technical care of these 16 million acres of private forests does not differ, in essential respects, from that given to the state and communal properties. About 30 per cent of them, however, are devoted to the production of hardwood fuel, with crops every 20 years, whereas the aim of the public forests is to grow as much large timber as possible. Upon her privately owned forests, France thus depends for the bulk of her lumber and fuel wood. Private forestry is a vital factor in her national economy.



Photograph by M. Garbe

A FOREST PLANTATION IN THE FRENCH ALPS

The ownership of forests, for hunting preserves, was highly prized by the lords of feudal France. Many areas were, indeed, kept in forest for the noble's pleasure, that should have been put into farms to support his half-starved tenants. So persistent is this tradition that the ownership of forests is still, in most parts of France, an earmark of gentility. Many of the private forests of today are relics of the old seigneurial estates. In the center of the Forest of Meillant, near Bourges, which was cut by the 20th Engineers, stands a thick stone table of triangular shape, with a colossal stone chair facing each of its sides. Here, according to local tradition, the three lords who formerly owned the forest met to settle affairs of the chase or matters of dispute, each nobleman occupying a chair on his own land. And here was played the game of cards, to settle a controversy or a wager, by which it was determined which of the three seigneurs should own the whole forest. The Marquis of Meillant won, but today his hunting preserve has passed into the hands of a French business man who makes airplane hangars for the government.

Other large areas of forest passed into private hands through the sale of crown and state property during the 50 years following the Revolution. This movement was analogous in many respects to the alienation of our own public domain, and marked the reaction of French individualism from the former power and functions of the state. A third source of private forests as we find them in France today was the planting of large areas in the southern sand plains and in the central and northern valleys about the middle of the last century. The successful forestation of the southwestern sand dunes by the government led to the planting of 1,500,000 acres of private holdings in the Landes and Gironde with maritime pine. At about the same time, several factors, particularly the shortage of agricultural laborers, brought about the reforestation of farm land in the Valley of the Loire and other highly developed parts of northern France. Many of the forests of Scotch pine in this region, which furnished thousands of poles and piles for the allied armies, were planted from 40 to 60 years ago.

Among the economic conditions which keep these 16 million acres of privately-owned land in continuous wood

crops, we recognize first of all the fact that France is a *wood-importing* country; and hence that the timber grown in her forests not only has a high value but is very closely utilized as compared with standards in the United States. The hardwood coppice, or sprouts, which furnish the bulk of the wood fuel of the country and were cut over enormous areas to keep the American Army warm, have an average value on the stump of probably $4.00 per cord. The value of a fuel crop grown on a well managed forest in 20 years ranges from $50 to $60 an acre as it stands in the woods; and an additional stumpage return is usually realized from the small brush or fagot wood. The stumpage values of the principal timber trees of France averaged, in 1917, at least five times the prevailing prices of similar species in the United States. Maritime pine stumpage in the Landes, comparable to rather low grade shortleaf pine in the southern states, sold for around $26 per thousand board feet. The oak timber of all grades, bought by our Army in the Loire River Valley and in the upper watershed of the Marne, probably averaged $36 per thousand board feet on the stump. The silver fir and spruce which we obtained in the Vosges and Jura Mountains, timber averaging 6 or 8 logs to the thousand feet, cost about $50 per thousand standing in the forest; but in buying selected piling we sometimes exceeded $90 per thousand board feet. And do not overlook the fact that these prices were obtained for stumpage grown as thick as the species and class of product permit in forests where no ground is wasted; and that they apply to all parts of the tree which can be utilized under the most intensive manufacturing standards.

The prices quoted are war-time rates, probably 75 per cent more than the stumpage values existing in 1914. On a pre-war comparison, however, the disparity between timber values in France and in the United States is very great. This difference is due not only to the shortage of supply and the necessity of importing a third of the lumber which the country uses. Low conversion costs due to the accessibility of the forests and particularly to the very low wages paid to forest labor are an important factor. The average French logger and mill-hand received probably five francs, or less than one dollar, per day in 1917, and this was considerably more than he was paid prior to the war. The simple and primitive methods of manufacture, by small, local mills, with almost no investment or overhead charges, are relatively inexpensive. With lumber values the country over influenced by the price of stock imported from the Baltic or other outside sources, with keen competition for all stumpage put upon the market, the standing timber gains the benefit of the low costs of manufacture. The stumpage owner holds the whip-hand. Hence the situation in the United States, where manufacturing cost is the chief element in the mill price of lumber, is largely reversed in France. The standing tree often claims a third or more of the selling price of its products.

The presence of large areas of non-agricultural land in France is a second economic basis for her private forestry. Her eastern mountain belt, extending from the Vosges to the Mediterranean Sea, her rugged Central Plateau, the northern slope of the Pyrenees, the southwestern sand planes, and the chopped-up hills in the upper reaches of the Marne and Seine contain a large aggregate of land fit only for forest or grazing. Intensive use of such areas is an economic necessity in a country so densely populated, and the bulk of her private forests are found in these non-agricultural regions. They are not limited, however, to areas too poor for cultivation. The economic balance between forest and farm crops has shifted at various periods in French history. At the time of the Revolution, the country was short of agricultural products, especially cereals; and a large acreage of forest was put in tillage. Fifty or sixty years later, the pendulum swung back. Shortage of farm labor appears to have been the immediate cause. At all events, many rural proprietors in central and northern France, finding their fields lying fallow year after year, resorted to tree planting. There has been no important change since that time with probably a slight tendency in later years to increase the farm area at the expense of the forest.

We in the United States follow the inflexible rule that the farm must always be given right of way over the forest; and doubtless that is the safest guide in our present stage of development. The economic growth of France has carried her beyond such broad assumptions. The demand for wheat and the profit in growing it compared with the demand for timber and fuel and the profit in growing these products are the considerations which govern. The area devoted to forest is fixed by the balance struck—over comparatively long periods of time—between all the economic necessities of the country; and that balance has not thus far limited her forests, either publicly or privately owned, to non-agricultural lands. This sort of readjustment is already impending in some of the older parts of the United States.

While such economic factors are at the bottom, we cannot understand private forestry in France aright without considering the conservative temper of her people, their contentment with comparatively low returns, their instinctive resistance to change in the accustomed order, so unlike the restless American, and that æsthetic value universally accorded to their forests. I have already referred to the social prestige carried by forest ownership. Many forests have been preserved as a beautiful setting for a chateau or as hunting grounds, their financial returns being a secondary consideration. Large areas of woodland, on the other hand, are held as safe, long-term investments. The vast fortunes of the Rothschild family include a number of large forests in central and northern France. Forest properties are highly regarded as stable securities for the investment of family or institutional funds. Well managed oak and beech forests yield net revenues of from 2½ to 4 per cent. Such forests furnish a crop of coppice fuel wood every 20 or 25 years and at the same time usually carry an over story of high-grade timber, which may require

200 or 240 years to mature but is actually harvested in small quantities at every periodic cutting. A large forest property is split up into lots or compartments, containing sprouts or timber of different ages. Some material is harvested every year or at least at intervals of every 4 or 5 years. There is thus an actual current revenue—proportioned to the size of the whole investment; and the problem of accrued carrying charges, which is so burdensome to the owner of undeveloped timber in the United States, scarcely exists in France.

Forestry as a commercial business is most highly developed in the pineries of the Landes, where the low value of the land and the combined yields of naval stores and timber make it exceptionally profitable. Net returns of 6 per cent on the investments in southern pineries are not uncommon. Here also the revenue is practically continuous. The larger properties contain blocks of timber of varying ages; and, aside from a steady return from turpentine orcharding, realize every few years upon a small cut of stumpage.

The great bulk of the French forests are in separate hands from the timber using industries. This, in my judgment, is a factor of importance in their conservative management. The forest is not the tail of the sawmill, but is relatively independent of the sawmill. Such would be the inevitable tendency in a country where timber is scarce and dear. The forest owner determines the amount and location of the stumpage which he wishes to cut from year to year. Foresters or forest rangers are employed on all of the larger properties, and the cutting area is selected, marked, and estimated by them. The timber is then advertised, as a rule, and sold at auction for the highest lump sum offered. The sawmills are uniformly small and most of them are portable. In the eastern mountains and other regions of extensive forests, there are many little stationary mills, driven by steam or water power, which obtain their logs from the yearly cuttings on any one of a dozen or more forest properties in their vicinity. Logs are hauled by ox teams, in full tree lengths, for distances up to 15 or 20 miles to these little mills. In the level pineries of the south, a light steam tractor of the "locomobile" type, operating a little band saw 3 or 4 inches wide, is almost universal. These little mills roam about the Landes, picking up a few hundred cubic meters of timber here and there, sawing it into boards, and then passing on, leaving neat, triangular cribs of lumber to be hauled out by the two-wheeled mule carts of the region whenever it has seasoned sufficiently.



A CAMOUFLAGED ROAD THROUGH A FRENCH FOREST BETWEEN CLERMONT AND VARENNES

In a word, the lumber manufacturing industry has grown up upon and adapted itself to a system of forest management which permits but small cuttings at any one place in any one year or series of years. Cases are rare when the well being and permanence of the forest are sacrificed to the requirements of a manufacturing enterprise—an exact opposite of the situation so common in the United States where the manufacturer owns the timber and has denuded one forest region after another in order to supply his large, stationary mills to their maximum capacity. While this relation is largely a result rather than a cause of the economic status of private forestry in France, it indicates the industrial adjustments which will become necessary in America as our emphasis shifts from supplying sawmills to growing timber.

The public policy of France toward her private forests is an interesting compromise between the restrictions of the imperial regime and the present day spirit of personal liberty. Under the Louis' the use and treatment of privately owned timberland were very closely regulated even to the marking of the trees which might be cut, by the king's foresters in some instances. This maze of harsh and burdensome restrictions was wiped out by the French Revolution, and for a considerable period private forest owners cut or destroyed as they chose. Then Nineteenth Century France, confronted with a shortage of fuel and lumber and awakened to the flood menace from her denuded mountains, reacted toward the old conceptions of restraint but only to the limited degree that the intrenched individualism of the republican era would permit. Under the law of 1859, which has been modified but little since enactment, the private forest owner is still free to cut his timber as he chooses; but he is responsible to the state not to *uproot* or destroy any forest area in excess of 25 acres without permission in advance.* Violations of this law are judged solely by the condition of the land, by the fact that forest denudation has actually taken place. Whether the disappearance of the forest resulted from the method of cutting, from over-grazing, from fire, or from deliberate clearing for tillage is immaterial. So is the intent or good faith of the owner. Whatever the

*This restriction does not apply to planted woods under 21 years in age or to trees within enclosed parks or gardens adjoining dwellings. The destruction of other areas up to 25 acres without warrant is permitted only in the case of isolated patches of forest which are not situated on the slopes or summits of mountains.

cause of "defrichement," the owner of the land is liable to a fine of from $35 to $115 per acre. He may also be ordered by the Minister of Agriculture to reforest the stripped area within a prescribed period.

These penalties may be avoided by obtaining permission to denude forest land in advance. The procedure is cumbersome, involving a declaration of intent by the owner of the land, an examination of the area by forest officers, reviews of the case by various administrative officials, and final decision by the Minister of Agriculture. The government may refuse permission to denude forests only when their preservation is necessary to protect stream flow, to prevent erosion or the shifting of sand, or to safeguard the public health or national defense. Many attempts have been made to include the timber needs of the locality or of the country at large among the reasons upon which the administration may refuse a warrant to destroy private forests; but none of them have yet overcome the resistance to this invasion of the individual liberty of the property owner.

During the Nineteenth Century, the denudation of about one and a quarter million acres of private timberland was authorized, mainly in the lowland hardwood regions.* With its limited application, the practical value of the law lies largely in its support of the efforts of the government to prevent deforestation in the mountains. It is of special interest to Americans, however, because it illustrates the point of view of the French toward their forests. A people fully as democratic and liberty-loving as we are has infringed the rights of private ownership more sharply in the case of forests than any other kind of property. The significance of this infringement can be appreciated only in a full understanding of the *sacredness* of private property in France. The French have done this because they put forests in a class by themselves. The public interests dependent upon the forests of the country and the lapse of time required to restore woodland once destroyed are, to the French, sufficient grounds for imposing special burdens and obligations upon owners of forests from which owners of other forms of property are Scot free.

On the constructive side, the special and distinctive public value of forests is recognized in their taxation. Forest plantations on mountain slopes or summits and on sand dunes or other barrens are exempted from taxes for a period of 30 years. When cultivated land is planted with trees, three-fourths of the taxes are remitted during the first 30 years. When land is planted which has lain fallow for a considerable time, the law provides that there shall be no increase in the assessed value, or rated income, of the ground for a like period. Aside from these exemptions, private forests in France are taxed on their current income, a method which dates back to the Revolutionary period. Under the law of 1907, a valuation commission periodically classifies the lands in all forms of culture, commune by commune, in accordance with their relative productivity. There may thus be three or four types of forest, as determined by their soil and timber species and the value of their products. A net yearly income is then obtained for average areas within each type. All forest properties shown on the official survey and plats of the commune are thus classified and a net income, based upon the sample tracts studied, is assigned to each.

The periodic revenues customary in French forests, where nearly all properties harvest some products every few years, are, under this system, reduced to an annual basis which represents the net returns for stumpage after deducting costs of upkeep, fire protection, forest guards, thinnings, planting blanks, and other cultural measures. The tax is levied upon this net income and usually amounts to 8 or 10 per cent, about half of which goes to the central government. The rest comprises the departmental and communal taxes and levies for local roads. It is of interest to note that French forest owners are demanding a straightout yield tax levied upon forest products when actually cut, the same principle which is generally regarded as the basis for forest tax reforms in the United States.

While the tax system is a distinct aid to private forestry in France as compared with American conditions, it is probable that the greatest public encouragement to the private owner to keep his timberland productive has been the stimulus and example of the publicly owned forests. These are scattered through practically every section of the country. In every forest region, the private owner has seen good forestry practice demonstrated for scores of years on state or communal holdings. He knows the forest officers in his locality and consults them on the methods applicable to his own woodland. The widely distributed public forests have not only set the standards of good management but have made the local silviculture a part of the farm lore of the region. The rural population of France knows how to grow trees just as they know how to grow potatoes or care for their vineyards. One day I met a wooden-shod peasant boy in the Landes who told me all about the handling of their pineries from thinning out the over-dense stands of young trees through the various stages in turpentining to the cutting of the timber. It was all part of his daily life. The educational value of her public forests has, in my judgment, done more to stimulate private forestry in France than any other public activity.

The French government has made special efforts in recent years to extend this educational influence by various forms of co-operation with private forest owners. Special recognition is given by law to associations of forest owners who desire to act collectively in the protection or management of their properties. And, by a law, passed in 1913, the expert services of the State are offered, at cost, to owners of timberland who wish to cut their holdings on a conservative basis corresponding to the requirements of the "regime forestier" and to obtain the special forms of protection against trespass now accorded to public holdings by the forest code. This law is of too recent origin to have yet demonstrated its value,

* These records go back only to 1828. Large additional areas were authorized between 1828 and 1803, when the first law was enacted. Many forests were also destroyed between 1791 and 1803 when no permits were required.

but it illustrates the trend of public forest policy in France.

Private forestry is, of course, on a totally different footing in France than in the United States. The dense population of France has of necessity brought about a relatively high value and a relatively intensive use of all classes of land. The shortage and high cost of timber products have given an economic impetus to the practice of forestry by private land owners which is approached in but limited parts of the United States. Notwithstanding the economic basis for forestry in France, which makes the growing of timber reasonably profitable, notwithstanding also her intensive demands for farm crops, France has found it necessary to place her forests under special protection and to enact special laws restricting the rights of private ownership in forests as distinct from all other forms of property. That broad fact is food for American reflection.

Lack of cheap lumber is an economic handicap in France. It is apparent particularly in her rural districts, where a new structure of any kind is a rare sight and the ancient, moss-covered farm buildings give an impression of decadence which is only partly real, but nevertheless, portrays forcibly the low standards of rural improvements which not only reduce the comfort and wholesomeness of country life, but inevitably lower the efficiency of agricultural industries. The per capita consumption of lumber in France is not more than 100 board feet per annum, less than one-third that of the United States. In other words, France illustrates the evils of a condition where lumber is a luxury, in part—an imported luxury. Her eighteen per cent of forested land is not enough. Her intensive forestry can but partially offset the effects of a shortage of timber-producing land. Hence the necessity of a national policy of forest preservation even at the cost of a reduction in farm crops.

It is not yet our problem in the United States to strike a close balance between the forest and the farm. That can be left to the economic adjustments of the future. It is rather our problem to put *idle land* to use. Production from land is just as important in the long run as production by labor or industrial organizations, about which so much is being said these days. The situation of France today is a striking warning that the United States can ill-afford the national loss of idle land. Public agencies doubtless must assume the greater part of the immediate task of growing timber on our idle cut-over land. But publicly owned forests cannot do all of it in the United States any more than in France. Our national policy should aim definitely and unequivocally at the practice of forestry by private owners as rapidly as that can be brought about by better methods of taxing timberland, by the co-operation and educational help of state and federal agencies, and by the recognition, on an equitable basis, of the obligations carried by forest ownership.

SIGNIFICANT TRENDS IN LUMBER PRODUCTION IN THE UNITED STATES

BY FRANKLIN H. SMITH, STATISTICIAN IN FOREST PRODUCTS

THE demands for wood made upon our forests are of greater importance each succeeding year, because of the annual growth in population and the gradual utilization of the surplus timber of the country. In the absence of any but rough approximations of the quantity of timber standing in the forests, the inroads being made upon the supply can be no more than assumed. The assertion, however, that the annual harvest is much greater than the annual growth is unquestionably well founded. As a basis for the contention that the vast supply has been and is being seriously impaired, one has but to point to the shifting centers of production as the available timber of a region is well harvested and the needs of the country are necessarily drawn in greater volume from some other region. Going back to the middle of the last century, we can distinctly trace the history of the lumber industry of the country at ten year intervals by showing the relative importance of the several producing regions. This has been done in Table 1.

A glance at the tabulation shows that in 1850 almost three-fourths of all the lumber was produced in two general regions—the northeastern group and the central group of States. The first named region embraces Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware and Maryland. The second, or central group of States, includes West Virginia, Kentucky, Tennessee, Missouri, Illinois, Indiana and Ohio. In 1918, or nearly seventy years later, the combined production for these two regions formed but 15 per cent of the total for all States. As the forests of New England and contiguous territory were depleted, the major activities of the lumber industry moved westward into the Lake States. Here the production rose from 6 per cent of the country's output in 1850 to a maximum of 35 per cent in 1880-1889, dropped off to 25 per cent in 1899 and to 10 per cent in 1918. For the southern group of States the per cent of total cut rose from 8 per cent in 1850 to 35 per cent in 1918. A later generation tapped the forests of the Pacific Coast group of States; the group contributed 8 per cent of the nation's lumber product in 1899, 15 per cent in 1909, and 27 per cent in 1918. The last figure rather startlingly directs attention to the decadence of the industry in other regions.

Some of the older men in the lumber industry today—and there are several patriarchs who have enriched our history of the lumber industry—have witnessed these

great changes and shifting scenes of production. It is remarkable that in the lifetime of such a man so many changes could be worked in the development of one of the leading resources of the nation. Within the allotted "three score years and ten" three immense regions have been divested of their forest cover to a large extent, and the fourth, the southern pine region, has reached its apex of production. No other land was ever more generously blessed with timber or timber so well adapted to man's needs as our own great stretch of country. Perhaps it has been the very great abundance of wood on every hand that has caused us as a people to value it lightly and countenance its ruthless destruction by fire and improvident lumbering methods.

There is an economic feature in this shifting of regions of production which stands out boldly like a figure outlined against the horizon. The figure in this case is the burden of transportation that puts its load on the consumer as the proverbial thumb of the butcher or grocer tips the scales when weighing our minor purchases of food. In 1850 the sawmill and consumer were within a reasonable distance of each other, and many communities secured their supply of wood from local mills. A decade or two later, as the timber near at hand became well cut out, the mills moved farther away. Still the distance lumber had to be hauled was not great and the cost was lessened by the use of rivers and canals for the movement of logs and lumber. With the timber supply and the bulk of the consumers ever getting farther apart, however, the economic burden of transportation has been laid upon the consumer and becomes increasingly heavy each year. In 1850 the center of population in the United States was Parkersburg, West Virginia. In 1910 it had moved to Bloomington, Indiana, or northward and westward, while the main production of lumber shifted to the southern and far western States. This transportation cost burden is a heavy one. Take a city like Philadelphia, for instance. In the earlier days rafts of logs and lumber coming down the Delaware and Schuylkill Rivers supplied the inhabitants of the city with wood. Then the big stores of white pine and hemlock in central Pennsylvania were unlocked by the lumbermen and much of Philadelphia's share was brought down the Susquehanna River and its tributaries, through the old Chesapeake and Delaware Canal and then up the Delaware River to the city. The water borne traffic was carried at a minimum of expense, possibly $1.50 or 2 a thousand feet. Subsequently the movement of western Pennsylvania lumber and still later that of the Lake States was by rail, and the transportation tax increased possibly to $2 or $3 a thousand feet. Today the freight charge amounts to from $7 to $8 a thousand feet on North Carolina pine, $9 to $11 on southern yellow pine, $11 to $14 on southern hardwood, while the freight charges on Douglas fir loom large at from $20 to $24 a thousand feet. In some instances the transportation charges alone



TOTAL LUMBER PRODUCTION 1850-1918 IN THE UNITED STATES BY GROUPS OF STATES

are the equivalent of the cost laid down in Philadelphia years ago of the Keystone State's justly famed cork white pine.

In the last 69 years—the period 1850-1918, inclusive—the forests of the United States have yielded approximately 1,614 billion board feet of lumber alone; how much more material, such as fuelwood, pulpwood, cooperage stock, and the like, can not be easily estimated. On the basis that 219 cubic feet of timber is utilized in producing a thousand feet of lumber, the total output of 1,614 billion board feet of lumber required the utilization of 353,466 billion cubic feet of timber, a figure too big to be readily comprehended. Assuming an average stand at five thousand feet per acre throughout the country, the 1,614 billion feet cut would represent the equivalent of cutting over 322,800,000 acres or an area as great as the combined surface area of the 18 States bordering on the Atlantic and embraced by a line drawn on the west to include New York, Pennsylvania, West Virginia, and Alabama—truly a vast area to be cut over.

The accompanying outline map of the United States shows the total production for each of the eight general lumber production regions for the period 1850-1918. A striking feature of the statistics as applied to the several regions is the close approach of the figures for three of the older regions; namely, the northeastern group, the Lake States group, and the southern group of States, with an aggregate cut of 313, 351 and 359 billion feet, respectively.

The lumber industry, the foresters, and even the Government itself have been placed at a disadvantage and sometimes embarrassed by the absence of reliable data on our timber resources, since with one exception there has never been any real effort made toward closely reckoning the stand of timber in the United States. Some of the latter day statements are perhaps no more misleading than that of more than a century ago, when it was reported in England that the New World could not supply spar timber for more than a few years longer. The single effort to estimate the stand was the survey made by the Bureau of Corporations in 1908-1909, which has been subjected to revision with passing years as facts developed. It is true, of course, that what a comparatively few years ago was looked upon as inaccessible timber or valueless species is now classed as accessible or commercial, and allowance needs to be made for similar changes in the years to come. There is a reasonably definite present-day knowledge of current timber needs; it is the dearth of data relative to the timber available that makes the future outlook unsatisfactory. Statistics on the production of certain forest products and on the consumption of others covering a series of years permit of an intelligent understanding of the demands upon our forests, and certain deductions may be drawn from these statistics as to the volume of the demands for the immediate future with their relation to the circumscribed knowledge of the actual supplies. But until a more intensive inventory is completed of what the forests of the country hold in the way of supplies, the lumbermen and the foresters and the public cannot advance far; because science demands exactness, without which scientific principles are impossible of formulation.

The major demands made annually upon the forests, based upon the latest available statistics, are shown in Table 2. In the first column the volume of production or consumption is expressed by the common unit of measurement; in the second column the equivalent is given in board measure; and in the third column the

Table 1—Lumber Cut By Groups of States, in Per Cent of the Total

Groups	1850	1860	1870	1880	1890	1900	1909	1918
Total	Per cent 100.0	Per cent 100.0	Per cent 100.00	Per cent 100.0	Per cent 100.0	Per cent 100.0	Per cent 100.00	Per cent 100.0
Northeastern group	54.8	37.0	37.8	25.8	19.8	16.3	11.7	7.4
Central group	18.6	21.1	20.0	18.4	13.1	16.1	12.3	7.8
Southern group	8.5	13.0	6.9	9.7	15.6	24.0	33.3	34.9
North Carolina pine group	5.1	4.8	2.5	4.1	4.7	7.7	11.6	8.3
Lake States group	6.3	13.6	24.4	34.7	34.6	24.9	12.3	10.1
Pacific group	5.9	6.4	4.0	3.6	8.5	8.3	15.5	26.9
Rocky Mountain group	0.0	.1	.9	.9	1.1	1.6	2.9	4.4
All other	.8	4.0	3.5	2.8	2.6	1.1	.4	.2

Northeastern group
Connecticut, Delaware, Maryland, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont.

Central group
Illinois, Indiana, Kentucky, Missouri, Ohio, Tennessee, West Virginia.

Southern group
Alabama, Arkansas, Florida, Georgia, Louisianna, Mississippi, Oklahoma, Texas.

North Carolina pine group
North Carolina South Carolina, Virginia.

Lake States group
Michigan, Minnesota, Wisconsin.

Pacific group
California, Nevada, Oregon, Washington.

Rocky Mountain group
Arizona, Colorado, Idaho, Montana, New Mexico, Utah, Wyoming.

All other
Iowa, Kansas, Nebraska, South Dakota.

approximate cubic contents of wood drawn from the forest to produce the products are enumerated. Several important products of the forest were omitted from the list, since they are incidental industries not directly representing a consumption of timber or wood. These additional products include turpentine and rosin—or naval stores, as they are sometimes called—hemlock and chestnut oak bark used in tanning, and the sap of the maple trees utilized in making maple sugar and syrup. The value of these crops runs well into the millions of dollars each year.

The tabulation indicates the annual use of the equivalent of 91 billion board feet of timber for all purposes in the United States. A substantial basis exists in nearly every instance for the figures given, and they may be regarded as conservative rather than overdrawn. Where statistics for a series of years were available, an average figure was used in place of the data for any one specified year in order to eliminate possible abnormalities. To produce these 91 billion board feet every year requires a yield of 23½ billion cubic feet of timber—a stupendous crop and worthy of the most prodigal nation.

Assuming a population in 1919 of 108,000,000 in the United States, the per capita drain on the forests is 219 cubic feet. The term drain is used in place of consumption, since no consideration is given nor deduction made in this article for material exported; such deduction, however, would not materially change the figures because of the tendency of imports to counter-balance exports. A per capita drain of 219 cubic feet is a heavy tax on the producing ability of our forests, and a heavier levy than is made by any other nation on its timber resources.

The timber situation in the United States may be likened to that of a man who years ago fell heir to a large fortune in cash and who has continued to check against the account most liberally without concerning himself about his balance. In all probability he has drawn more than the interest earned each year, but he is not certain even of this fact because he knows not what part of his principal remains. And so it is with our forest resources —we have gone on drawing heavily upon them each year without knowing what remains or what the annual increment or volume of new growth may be. The fact is substantiated by the data given in Table 1, that certain producing regions have been pretty well cut out. This in itself should be sufficient to convince the most skeptical that our raids on the standing timber of the country have been very successful in reducing the available supply.

How vital our forests are to the commerce and industry of the country can be better appreciated by quoting a few figures. Fifty-two thousand, or 19 per cent, of the 276,000 manufacturing establishments in this country use wood solely or in part as raw material. These 52,000 establishments furnish employment to 1,130,000 wage-earners, or 16 per cent of the 7,000,000 wage-earners in the United States. Whatever goes toward curtailing the supplies of raw forest products to these establishments tends to rupture the continuous employ-

Table 2—Annual Consumption of Timber in the United States.

Form Used	Quantity Produced or Consumed	Equivalent in Feet Board Measure	Cubic feet of Timber Required to Produce
Total		**91,308,000,000**	**23,611,556,000**
Fuelwood	**110,000,000 cords**	**36,663,000,000**	**10,450,000,000**
Lumber	**37,300,000,000 ft. B. M.**	**37,300,000,000**	**8,168,700,000**
Fence Posts	**900,000,000 posts**	**4,500,000,000**	**1,800,000,000**
Hewed cross-ties	**87,500,000 ties**	**2,625,000,000**	**1,050,000,000**
Pulpwood	**4,550,000 cords**	**2,548,000,000**	**532,350,000**
Round mine timbers	**250,000,000 cu. ft.**	**1,500,000,000**	**325,000,000**
Shingles	**8,850,000,000 shingles**	**885,000,000**	**194,700,000**
Wood Distillation	**1,550,000 cords**	**868,000,000**	**181,350,000**
Tanning extract wood	**1,250,000 cords**	**700,000,000**	**146,250,000**
Veneers	**650,000,000 ft. logs**	**780,000,000**	**119,600,000**
Tight staves	**286,000,000 staves**	**286,000,000**	**95,238,000**
Vehicle stock	**300,000,000 ft. B. M.**	**300,000,000**	**90,000,000**
Slack staves	**1,010,000,000 staves**	**337,000,000**	**66,660,000**
Woodenware	**350,000,000 ft. B. M.**	**350,000,000**	**56,000,000**
Poles	**4,250,000 poles**	**255,000,000**	**55,250,000**
Handles	**200,000,000 ft. B. M.**	**200,000,000**	**50,000,000**
Slack heading	**61,000,000 sets**	**122,000,000**	**49,471,000**
Hewn and rough export	**200,000,000 ft. B. M.**	**200,000,000**	**45,000,000**
Lath	**2,375,000,000 lath**	**475,000,000**	**35,625,000**
Tight heading	**21,000,000 sets**	**84,000,000**	**34,125,000**
Excelsior	**200,000 cords**	**120,000,000**	**23,400,000**
Hoops	**333,000,000 hoops**	**100,000,000**	**19,647,000**
Piling	**1,500,000 pieces**	**90,000,000**	**19,500,000**
Ship building	**10,000,000 ft. B. M.**	**10,000,000**	**2,190,000**
Furniture	**10,000,000 ft. B. M.**	**10,000,000**	**1,500,000**

ment of a vast army of wage-earners and affects the larger army of their dependents. In a nutshell, then, we have it that one-fifth of all the manufacturing establishments and one-sixth of all the wage-earners in Uncle Sam's vast domain would be adversely affected by any reduction in the supply of materials from the forests.

"What are you going to do about it?" was the pertinent and impertinent question of the small boy when rebuked for pulling the plums out of the pudding. In the particular case of timber, the answer is more easily found. Timber is one of the things God has provided for mankind and made to grow on hillside and valley in plain sight. It is a natural resource that is not hidden. It can be seen and estimated. That is the answer. To make an estimate will require time, money and an organization intelligently directed. Since the welfare of so many wage-earners together with investments aggregating billions of dollars of capital, depend upon an estimate being made despite the expense, I predict that some day Congress, reflecting public sentiment, will require that a timber census be made, and that day should not be far off.

THE NEWS PRINT PAPER SITUATION

BY R. S. KELLOGG

THIS is most truly a Paper Age, and, in the United States at least, a Newspaper Age. The consumption of news print paper has gone far beyond the limits that would once have been predicted by the most enthusiastic advocate of the newspaper as a source of popular information and education. In 1880 we were able to get along with 3 pounds per capita of news print paper. By 1894 our requirements had increased threefold, to 9 pounds, and 25 years later, or in 1919, the consumption of news print paper per capita in the United States was 33 pounds, or more than 10 times what it was 39 years earlier.

Leaving all the other means of publicity out of the question, the average circulation of the daily newspapers in the United States is now some 27,000,000 copies, or one for every family in the country, and a large proportion of these papers are not small ones, either. There are something like 70 newspapers with a daily circulation of 100,000 copies or more each, and for the past year these papers have averaged about 23 pages on week days, while the number of pages in those publishing Sunday editions has been over three times as great as in the daily editions.

The production of news print paper in the United States and Canada is a common industry with common markets. The total output last year was 2,183,000 tons, and 90 per cent of this total is classified as standard news, such as is used by the daily papers. In the form of sheets last year's production of news print in North America would cover 10,000,000 acres or belt the earth 50 miles wide. In the form of a standard 73-inch roll it would unwind 13,000,000 miles, or little more than 7 years' output at the same rate would reach from the earth to the sun.

The annual increase in production figured on a compound interest basis has averaged 6 per cent for the last 15 years. In 1904 the production in the United States, in round numbers, was 913,000 tons, and practically none in Canada. In 1913 the production in the United States slightly passed 1,300,000 tons, and that in Canada amounted to 350,000 tons. Since 1913 there has been little increase in the United States output, but a steadily ascending production in Canada, which in 1919 passed 800,000 tons, while the production in the United States amounted to 1,375,000 tons.

For the last six months the newspapers and trade journals have devoted much space to the discussion of a so-called shortage in news print supply, but there has been no shortage so far as production is concerned. It has been due entirely to greatly increased consumption. The mills have been producing more news print than ever before in history, and the stringency in the market has come about entirely through the efforts of the publishers to use more paper than has been produced. This, of course, has been caused by the tremendous increase in advertising, while there has been little decrease in circulation over the high levels reached during the time of great demand for news during the war. During the past few months the total stocks in the hands of newspaper publishers or in transit to them have averaged between 30 and 40 days' supply, as compared with more than 60 days' supply during the summer of 1918, when the war was nearing a climax. On the other hand, mill stocks have been averaging only 3 or 4 days' production, thus showing the absolute necessity for an unbroken flow of paper from mill to publisher.

Notwithstanding an increase of 185,000 tons in news print production in 1919 over 1918, new machines to come into operation in 1920 will, if all goes well, turn out nearly 90,000 tons of paper, while numerous other new machines are scheduled for 1921. If plans now actually under way are consummated, by this time in 1922 new machines and new plants not in existence in 1919 will be in operation with a total capacity in excess of 1,500 tons per day. This would seem to be ample to take care of the requirements of the publishers, but to predict consumption so far in advance is hazardous.

Newspaper advertising in 1919 was about 40 per cent more in volume than in 1918, and it is starting off in 1920 some 40 per cent in excess of the amount during the first part of 1919. Advertising experts insist that there is a perfectly tremendous volume ahead.

THE USES OF WOOD

WOOD IN AGRICULTURAL IMPLEMENTS

BY HU MAXWELL

A GENERAL difference is understood to exist between agricultural implements and farm tools, but the difference is not always clear or always observed. The two classes overlap and it is not always easy to determine which is tool and which is implement.

If it is understood that tools are operated by human muscle alone, and implements depend upon horses, oxen, steam, or gasoline for power, the differences are quite distinguishable in most instances. The definition is here accepted that implements are operated by power greater than man's muscles, and that tools are intended to be operated principally by hand. This article deals with implements.



BRUTE POWER IS EXPENSIVE

Contrast this elephant and its two operators, scratching a quarter of an acre a day, with the power tractor in the picture on the next page, with a single operator, doing a hundred times as much work and doing it a hundred times better. The old and the new look strange side by side. *Photograph by courtesy of the International Harvester Company, Chicago.*

Agricultural tools were in use thousands of years before implements held place in agriculture. Perhaps the plow was the first farm implement, and was drawn by a camel, a horse, or an ox. It was primarily a small, crude affair, wholly of wood, or with only a point of iron, bronze, bone, or shell. Before that simple plow came into use, the tiller of the soil employed a sharp stick, a hoe, or spade, in stirring the soil. No record exists, nor can even an approximate date be assigned, of the earliest use of the animal-drawn plow in Egypt and Mesopotamia. It is generally assumed, but without much historical proof, that the earliest animal plows were in those countries. They may have been there, but some evidence exists that harnessed horses worked in France earlier than we have any evidence of their domestication in the valleys of the Nile and the Euphrates, and possibly they drew plows there in prehistoric times. But while these occurrences, if they really happened, would interest the archæologist, the proof is not sufficiently tangible to claim much attention here where a somewhat statistical discussion of the use of wood for agricultural implements has been undertaken.

American history easily goes back to a time when no plows were used in this country. The Indians were agriculturists as well as hunters, though that is not the common belief. They grew corn, and garden and field vegetables, and stored them for winter. All the Indians did not do so, but those who did not, incurred the risk of starving to death during the winter. Indians near Chillicothe, Ohio, for example, had hundreds of acres of corn in compact areas, and other Indians had cornfields in most regions where they lived; yet they had no plows. They stirred the soil with sharpened sticks with which they punched and gouged a few inches deep. Their greatest progress in the direction of farm tools consisted in the substitution of copper, shell, bone, or stone hoes; but they had no domestic animals stronger than dogs, and these mongrels were not able to pull plows and never did so.

The earliest American plows were almost wholly of wood, the same as the plows of that period in Europe. Blacksmiths made the iron points, and that was the only metal in the implement. The early moldboard—the part that was instrumental in turning the soil over—was of wood in the earliest plows, and development from that primitive pattern was slow. It took nearly a hundred years from that stage of development to reach the present model of the best two-horse plow; but a hundred years is not long when it is remembered that the plow with the

iron point and wooden moldboard was probably five thousand years in reaching that stage from the first use of a plow drawn by animals.

Plows made wholly of metal are in use, some of them not having a particle of wood in their construction. But wood is the principal material for the beams and handles of most plows, and the yearly bill of plow lumber is very large, and most of it is oak, both for handles and for beams. The development of the plow has not stopped with the practical perfection of the two-horse implement. Patterns more pretentious are constantly coming into use.

The harrow has always been associated with the plow, and apparently it goes back as far in history. Both are mentioned or pictured in very ancient records. Iron harrows were in use three thousand years ago if ancient chronicles are correctly interpreted, and wooden harrows are still in use today; so it cannot be said that metal harrows have ever superceded those of wood. Among the southern Appalachian Mountains farmers may still occasionally be seen harrowing their steep fields with a thorn bush dragged by horses or oxen. That sort of harrow was formerly not uncommon on the frontiers in forested regions. Some one of the many species of thorn (*Crataegus*) was preferred because of its profusion of tough, pliant branches which, by being dragged, pulverized and smoothed the freshly plowed soil.



"THE FOREMOST FILES OF TIME"

So far as the use of wood is concerned, perhaps the elephant in the accompanying picture has the advantage, but there is no comparison between the efficiency of the two machines. Civilization long ago turned the brute down as a working force, and harnessed science. *Photograph by courtesy of the International Harvester Company, Chicago.*

Another sort of harrow was no less simple. It was wholly of wood and was toothless. It consisted of a log about ten feet long, dragged broad-side on, across the plowed land to break the clods and level the inequalities left by the plow. It was moved forward in the same way as the roller, but it did not roll. This crude implement, like the thorn bush harrow, is not yet wholly obsolete. It is called a "drag." In rural districts it is used for smoothing roads, during the spring repairs. The same drag may see service in preparing the early fields for oats, where a smooth surface is wanted.

Harrows of wooden frames and wooden teeth were in use until comparatively recent years, and they may occasionally be seen in the tool lofts and lumber sheds of barns and granaries in central and southern states. The teeth of such harrows were naturally the portion that wore most rapidly, and the hardest woods procurable by farmers were employed as teeth. The teeth-woods varied with the region. Where yellow locust was to be had, it was always used, but hickory, hornbeam, maple, beech and even oak were employed. Wood was generally cheap, and the farmer who made the teeth for his own harrow could afford a new set every few days during harrowing time. Supplies were kept on hand and were thoroughly seasoned, ready for instant call. An English traveler in America, John Woods, writing about the year 1821, concerning a trip he had lately made through Illinois, had this to say of harrows: "They do not generally use harrows, but when they do, they are made with wooden teeth; nor have I anywhere in America seen iron-tined ones, except in the English Prairie." The place here designated was in southern Illinois.

Agricultural implements are divided into classes according to uses intended. Those in the first class prepare the soil for crops, and in this category belong plows and harrows, rollers, and fertilizer spreaders. It is, perhaps, not strictly proper to include the clearing and leveling of land, though if implements for this work are included, account should be taken of scrapers for improving the surface of uneven ground, and stump pullers for clearing ground about to pass from forest to field, and power skidders when land clearing is carried out on a large scale.

After the ground has been made ready for planting, a long line of implements is available for the work which follows. These include drills for small grains



A LITTLE WOOD STILL APPEARS IN THE HARROW

The thorn bush dragged over the plowed ground was the first harrow; the one shown in the picture is the latest; and a long gap separates the two. The earliest was wholly of wood, while the latest has little, but enough to make it efficient. *Photograph by courtesy of the International Harvester Company, Chicago.*

which once were sown broadcast by hand; planters for corn, and special machinery for planting other crops.

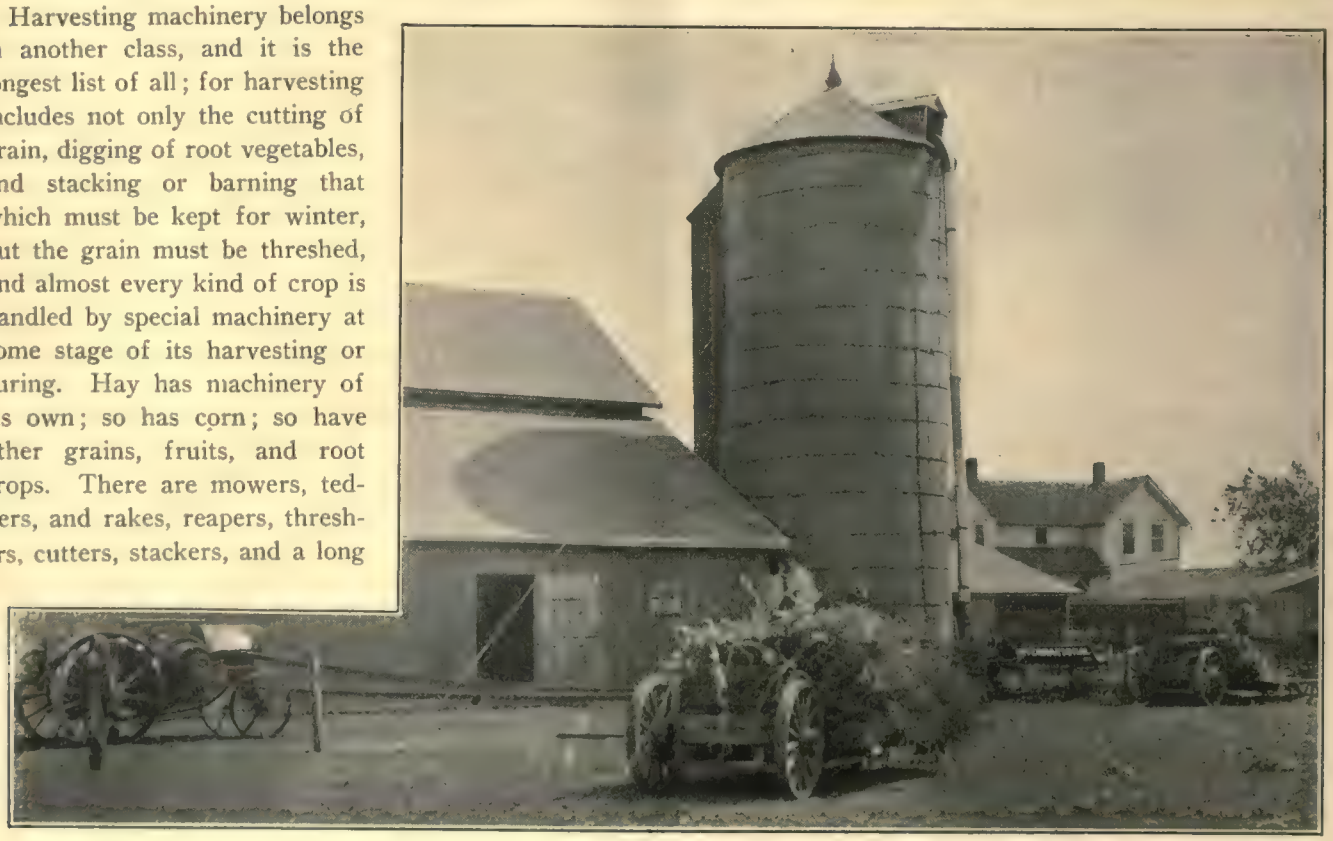
Cultivators constitute another class. They do the work between the planting and the harvesting. Corn, cotton, cane, and other crops, including vegetables, that are planted in rows, call for cultivators, and the kinds are many. Nearly every sort of crop has been provided with a series of cultivators fitted to its particular needs.

Harvesting machinery belongs in another class, and it is the longest list of all; for harvesting includes not only the cutting of grain, digging of root vegetables, and stacking or barning that which must be kept for winter, but the grain must be threshed, and almost every kind of crop is handled by special machinery at some stage of its harvesting or curing. Hay has machinery of its own; so has corn; so have other grains, fruits, and root crops. There are mowers, tedders, and rakes, reapers, threshers, cutters, stackers, and a long line of others. Lists would be tedious because of their length; at the same time, they show how great has been the inventive genius of Americans in providing scores of excellent implements to do the work on farms where a few simple tools sufficed not many years ago.

The simple tool had about reached the limit of its possibilities; and agriculture would have remained stationary had not improved appliances been invented. The wheat crops of today could not be harvested with the sickles, cradles, and rakes that were in use in 1830, even if the plows and harrows of that time could have prepared the land and planted the crops. If the wheat of the present time, after being harvested, depended upon the threshing facilities of 1830, most of the grain would be lost, because it could not be handled. The "groundhog" threshing machine of that day would be as incapable of saving the present wheat crop, as the prairie schooners of the same period would be incapable of carrying the grain to market.

Farm machinery and transportation facilities improved and increased side by side. America's commerce and population were growing and the demand came for better facilities than had been known in the past.

It is not necessary to detract from the importance of steel in the phenomenal expansion of agriculture; but wood's place has been no less indispensable, and perhaps it has even gone ahead of steel in some essential particulars. The forests have done a work at least equal to that done by the mines; but the importance of wood is not confined to the past. It continues without any



FILLING THE FARM SILO

Everything here is up to date. The wooden silo is the most pretentious thing in view, and the tractor, wagon and silage cutter are doing the work of converting the green corn into approved provinder for the following winter. Silos by thousands are built yearly, and every silo calls for the latest machines. *Photograph by the International Harvester Company, Chicago.*



THE CALIFORNIA COMBINED HARVESTER

At one end of the harvesting evolution stands the sickle, and at the other end is the combined machine which cuts and threshes all at one operation. Between the sickle and the harvester intervenes practically the whole span of human history. Gasoline tractors are now taking the place of the horses. *Photograph by H. H. Alexander, Fresno, California.*

indication that it will ever lose first place in the manufacture of agricultural implements. A hundred years ago most farm tools were of wood. Metal constituted such parts only as could not be made of wood. It is not known how much wood and how much iron were used in the United States a century ago in the manufacture of farm tools, but late statistics show the present demand for wood for implements, and it exceeds 320,000,000 feet a year, and if the wood which goes into hand tools for the farm were added the total would probably exceed 400,000,000 feet. In the list which follows, the forest's contribution to this great industry is shown according to kinds of wood and the quantity which each kind furnishes yearly.

Kind of Wood	*Feet Annually*
Yellow pine	98,543,396
Oak	69,346,130
Maple	48,319,210
Cottonwood	15,143,000
Yellow poplar	12,412,300
Red gum	11,976,000
Ash	10,677,400
Hickory	9,860,470
White pine	8,243,440
Basswood	7,861,750
Elm	7,249,000
Beech	4,968,490
Birch	4,704,000
Cypress	2,682,000
Spruce	2,623,500
Douglas fir	2,537,250
Hemlock	1,257,400
Tupelo	1,140,000
Chestnut	884,000
Sycamore	290,000
Western yellow pine	219,000
Redwood	200,500
Larch	100,000
Sugar pine	50,000
Butternut	10,000
Eucalyptus	10,000
Black walnut	8,000
Hornbeam	1,200
Cucumber	1,100
Mahogany	500
Cherry	300
Total	321,319,336

No important wood that grows in the United States is missing from the foregoing list. Both softwoods and hardwoods are represented, but the latter appears in nearly double the quantity of the former. The employ-



REAPERS DRAWN BY TRACTOR

The reaper was developed as a machine to be drawn by horses, but it did not stop there. The next step was to dispense with the horses and substitute engines, which could work faster and at less expense. The principal parts of the modern reaper are still made of wood. *Photograph by the International Harvester Company, Chicago.*

ment of wood in the manufacture of agricultural implements is not controlled by chance. Every use is backed by reason.

Implements drawn by horses are equipped with poles or shafts and these are nearly always of wood. This material has first place because it furnishes the necessary strength without being too heavy; because it is elastic and will yield without jolts and jerks, and such would occur if shafts and poles were of metal. It is necessary, however, if the best results are to be secured, that the wood for shafts and poles be carefully chosen. All woods are not suitable and relatively few are wholly satisfactory. Some lack the necessary resiliency, some are weak and brittle, some are not tough enough to stand the strain. Hickory and ash are more used than any others; but birch, elm, oak and maple are satisfactory for many kinds of poles, and in some instances the strong yellow pines are acceptable. Most of the shafts which are steamed and bent are hickory or ash.



"A SOWER WENT FORTH TO SOW"

He continued to go forth in exactly the same way for several thousand years until a better way was discovered, and the better way is illustrated in the accompanying picture shown below. The teaching here is by contrast—the old and the new side by side. *Photograph by courtesy of the International Harvester Company, Chicago.*

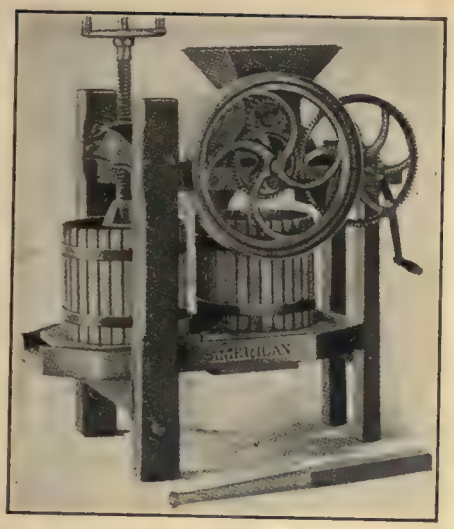
Many agricultural implements are equipped with hoppers, chutes, elevators, and conveyors. Most of these belong to machines for threshing, cleaning, sorting, or grinding grain. Platforms provide standing room for the operators. These appliances do not require tough woods, but in some instances hard and strong kinds are wanted. Elasticity is not essential, for strains are not usually great, or jolts severe or sudden on hoppers and conveyors. But woods are desired which will take a smooth finish and that are light in weight. Such qualities are found in most of the pines, in hemlock, redwood, cottonwood, basswood, tupelo, red gum, cypress, and yellow poplar. Boxes, com-



SOWING GRAIN IN THE NEW WAY

The machine does better work and a great deal more of it than was possible in the old time when a man threw the grain from his hand, hit or miss, just so it fell somewhere in the field, which it did not always do. Machines distribute it with mathematical accuracy. *Photograph by courtesy of the International Harvester Company, Chicago.*

partments, and drawers are essential parts of many machines in the barn or granary, and the woods of which these are made do not differ from those for hoppers and chutes.



HOW THE APPLE CROP IS SAVED

The clumsy, wasteful and uncleanly method of making cider which was the only way known on the farm a few generations ago has been relegated to the past by a machine which grinds and presses the fruit with little waste of time or waste of apples. Such presses are now found on most farms which have orchards of bearing apple trees.

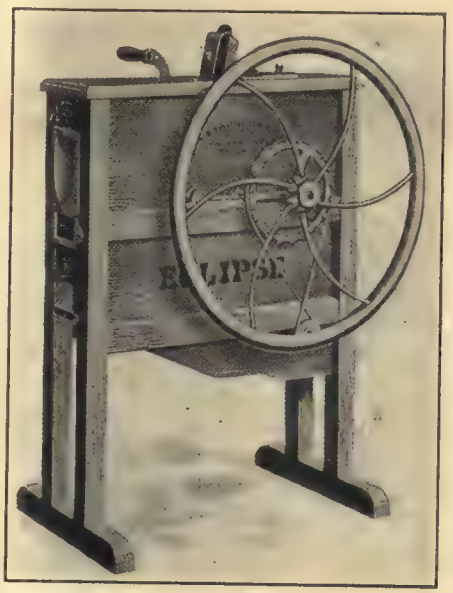
In a study of the evolution of farm tools and machines, and their stage of manufacture at the present time, two outstanding features claim attention. The first is, the extreme slowness with which improvements were made in early times compared with the rapidity with which invention has followed invention during the past century. The other remarkable fact is that wood has always held and still holds a prominent place in such manufacture. Inventions have not lessened the demand for wood, but have augmented it. An increase in the use of iron has occurred also, but it has not been more rapid than has been the growth in the demand for wood in the agricultural implement industry. America has led the world in the invention and manufacture of appliances belonging in this industry. Nearly all improvements have originated here. Farm machines from the United States are shipped to all agricultural countries of the world. Two causes have been chiefly responsilbe for the growth of the industry in this country, namely, cheap land and dear labor. This is equivalent to opportunity and necessity, or to a reason why it should be done, and the means of doing it.



CLEARING LAND BY MACHINERY

Strictly speaking, the stump puller may not be a farm implement, but few implements are more essential in a new country. The old way of clearing land with ax and mattock is too slow, and powerful machines are brought into use to put more speed into the operations. Clearing cut-over land is a large business now.

Up to one hundred years ago—in fact as late as 1845—America with all its fertile land, did not raise enough wheat to feed its own people. The cost of doing it was too high. Hand labor prevailed almost exclusively, and a large number of farmers was necessary to grow and care for the crops. Though a much larger proportion of the people lived on farms than at the present time, only four and a third bushels of wheat per capita were produced in the United States in 1845. Forty-five years later, with relatively fewer persons on the farms, the production of wheat was ten bushels per capita.



HANDPOWER CORN SHELLER

This is not the largest or most powerful shelling machine in use, but it is found on nearly all farms where corn is grown. The sheller is of wood, generally of maple and oak, except that the throat and jaws are of steel, in the part of the machine where the strain is severest.

In 1830 the work of one man for three hours was required to grow and harvest a bushel of wheat. Sixty years later, a fraction of that labor sufficed to produce the bushel. Again, machinery must have the credit, and the efficiency of such machinery is so well understood that American farmers now spend one hundred million dollars a year for machinery. Wages are much higher than they were seventy-five years ago, yet most farm products are cheaper. It is because one man with suitable machines can produce more than a much larger number of men, working in the old way, could produce eight or ten decades ago. It is claimed that one man with machines can raise as much rice in Louisiana as four hundred men with hand tools can raise in India.

The need of inventions was felt before the inventions came, otherwise, they would not have come. Yet it seems strange that the need was not felt and that results did not follow, hundreds of years earlier. Nearly two thousand years ago a reaper, foreshadowing the present one, was invented in France, but was forgotten. A century ago most wheat fields contained less than five acres each. That was true particularly when the farmer depended upon his own and his family's labor. Wheat must be harvested within a few days after it is ripe, or it falls and is lost. Four or five acres were as many as the average farmer could reap with a sickle. If he grew

a large acreage, part of it spoiled before he could harvest it, and there was no incentive to grow larger crops.

A farmer so situated was not interested in threshing machines. He could pound out his small crop with flails, or tread it out with horses during the winter when he had little else to do. Consequently, no inventor was encouraged to make a threshing machine, and there was none worth the name till later years.



A PALESTINE THRESHING FLOOR

Exactly as used in David's time, 3,000 years ago, a flat rock, near the supposed site of Ornan's floor. Scripture commands that oxen tramping out the grain shall not be muzzled, but these are. We learn here by contrast. Compare this crude method with that shown in an accompanying picture where a machine is doing the work. *Photograph by courtesy of the International Harvester Company, Chicago.*

The invention of the reaper opened the door to nearly everything else in the agricultural implement line, for one thing led to another. It happened that railroads began to be built the time the reaper was invented, and this provided means for carrying wheat to market, and farmers in remote localities, if near railroads, were encouraged to grow wheat. Before that time, grain went to market in wagons and could not go far, or it went by boats on rivers, and navigable streams were remote from many regions suitable for wheat growing. The reaper and the railroad solved the wheat problem, and the necessity for farm machinery led to inventions for planting and harvesting the crops.

Wheat has been here spoken of in some detail, not because it was the only farm crop, but because it stands in a measure for all. Its history is much like the history of other farm crops which began to increase rapidly about the same time. The invention of serviceable farm



THRESHING MACHINE AT WORK

Fifty yoke of oxen, as shown in the accompanying picture, could not tramp out as much grain as this one machine, and the machine's work is better and more sanitary. A man can scarcely sew the sacks of grain as fast as they are filled. Man is the only animal at work here. *Photograph by courtesy of the International Harvester Company, Chicago.*

machinery solved the labor problem, made farming profitable, and opened the way for the utilization of the abundance of cheap lands.

It would be interesting to follow in detail the development of farming due to the invention of machines, but it is not necessary to do so. The remarkable results are well known. The farmer once did well to plow an acre a day, and now the largest power plows will do a hundred acres a day. The farmer once harvested half an acre a day with a sickle. The combined harvester now does a hundred times as much. Similar improvements are found along the whole line of farming. Implements are responsible for the change, and it is interesting to note wood's part in the great agricultural implement industry. It is safe to affirm that the development of this industry could never have occurred in the treeless regions of Mesopotamia, Argentina, or China, though the land, the people, and the necessity are there. The lack of suitable woods for machines would have hindered invention and discouraged manufacture, though iron might have been abundant. Conditions and resources were just right in the United States, with the result that we have outstripped all the rest of the world in the invention and manufacture of agricultural implements.



THREE IMPORTANT MACHINES

This picture shows three important machines—a mower, a windrower and a loader—and some of the best wood in America appears in their construction. They have replaced the scythe, hand rake and pitchfork, and have done it within the past century. *Photograph by courtesy of the International Harvester Company, Chicago.*

More farm machines are destroyed by rust and rot than by wear and work. With protection and care, implements should serve twenty years, with only an occasional replacement of those parts subject to excessive wear. Instead of twenty years, the average life of a binder is twelve years, and of drills, seeders, and rakes ten years. In many instances such a machine is ready for the scrap pile in four or five years; but it is due to no fault or failure of the machine. Lack of protection against rain and sun is responsible. The machine is often left exposed to weather for days or weeks while not in service, and the metal parts become pitted with rust and the wood is attacked by decay. After that happens, a little time is all that is needed to complete the destruction. On some farms the aggregation of machines in the barnyard or elsewhere looks like an accumulation of junk. That is unprofitable farming and is on a par with the habit of leaving horses, cattle, and sheep without shelter in winter. When machines are thus neglected, it becomes an even race between the wooden parts and the metal to determine which will be ruined first.

Too many farmers take poor care of machinery even when they do the best they know, because they understand few of the principles on which machines are built. They do not know how to keep the correlated parts in order or properly adjusted. That condition is slowly passing, however; largely because agricultural colleges are giving instruction in the care and operation of machines, and the conditions on farms are improving. Implements are giving better and longer service, and profitable use is leading to greater use.

When farmers have a better understanding of the good points of machines, manufacturers will make better machines. The tendency is to furnish the best that farmers will buy and use. It has always been the rule that manufacturers have given more thought to the making of implements than farmers to using them.

AMERICAN LEGION PLANS MEMORIAL TREE PLANTING

NOW come Arbor Days again. So general has become the response to the call of the American Forestry Association for the planting of memorial trees that these Arbor Days have now become memorial days. Trees are being planted not only for him who gave his life to his country, but in honor of him who answered his country's call. This form of memorial appeals particularly to the officers of the American Legion and inquiries about selecting and planting trees are coming to the American Forestry Association from every state. Memorial trees are to be used as the setting for the memorial building or memorial group adopted in many places. The "Roads of Remembrance" idea of the Association fits in with the tree planting suggestions and the placing of what ever form of memorial may be adopted. Hugh W. Robertson, assistant to the Commander of the Department of New York State, has placed the plans for tree planting before the committee on memorials for that state. Thomas Goldengay, the State Adjutant for New Jersey, has placed the matter before the posts in that state. Russell G. Creviston, writes from the national headquarters at Indianapolis that he will put the suggestions before the state adjutants throughout the country. La Vere R. Collier, of the Idaho Department, has forwarded post lists to the Association so the commanders may get the information direct. From this enthusiasm it seems that the soldiers themselves will do some of the memorial tree planting. They saw as perhaps no one else could see, the value of forests and good roads in France. The result of this co-operation will be a more widespread interest in trees and an awakening to their value.



AN ARBOR DAY PLANTING

This tree, planted by the daughter of a Governor, has been entered in the "Who's Who" of famous trees now being compiled by the American Forestry Association at Washington. Miss Gertrude Black, daughter of the Governor of Kentucky, is shown planting this tree near the Governor's mansion at Frankfort, Kentucky, as part of the Arbor Day exercises throughout the State. The schools of Kentucky, particularly at Louisville, are making a great record in tree planting.

The attention being given to memorial trees by the schools of the country is well shown in the memorial tree planting by the Arsenal Technical High Schools of Indianapolis. This school is only seven years old but has enrolled nearly 3,000 students. It is situated on the site of an old United States Arsenal and the army buildings as Guard House, Barracks, Artillery Building, and Arsenal lend themselves readily for use as school rooms. It is the hope of the school to make the campus, consisting of 76 acres, a nature park in which are found every species of plant indigenous to the State of Indiana. The school sent 232 boys and one girl to the front. It did honor to these patriotic students on Armistice Day by planting and dedicating a tree to each one in a part set aside as "Liberty Grove."

This park was dedicated with appropriate exercises by the members of the January senior class, Milo H. Stuart, principal of the high school, presiding. The two hundred and thirty-third tree was planted with ceremonies by Walter Shirley, president of the senior class, and decorated with the national colors by Mary Cain, vice-president of the class.

"Liberty Grove" was formally dedicated by Mr. James H. Lowry, secretary of the Park Commission of Indianapolis. The oration of the day was delivered by Dr. Orien F. Fifer, pastor of the Central Avenue Methodist Church. The program closed with the singing of *America*. The trees for "Liberty Grove were donated by the Board of Park Commissioners of Indianapolis, and are of every variety typical of America. A group of the seniors has taken it upon themselves to see that the grove is preserved and to personally see that any trees which may die are replaced. The names have all been registered on the national honor roll being compiled by the American Forestry Association.

Women's clubs are finding in memorial tree planting a most fitting way for honoring a town's heroes. At Columbia, Pennsylvania, the organization of which Miss

Lillian S. Evans was the chairman, planted trees near the Lincoln Highway. The exercises were opened with the singing of the *Star-Spangled Banner* and then prayer by Rev. G. F. Hayes. General Shannon, or "Two-Yard" Shannon, the hero and idol of the Iron Division, spoke, and Reginald Wright Kauffman made the address. In this talk Mr. Kauffman expressed his views of the tree as a memorial. He said:

"Just before the war started, I was lunching in New York with a friend of mine, a poet. Our talk turned on a volume of his poems that was soon to be published, and among these poems was 'Trees.' That poet's name was Joyce Kilmer. When America entered the World War, he volunteered for service and, arrived in France, he always asked for the most dangerous work. A few months since, I came upon his grave in the American Military Cemetery at Seringes —where there was no tree, no green thing at all—and close beside it the graves of two of the boys we are remembering today: Leo Bittner and Cyrus Mathiot. For the soldier dead I think that you could have chosen no more fitting memorial than a living tree. Mankind has always regarded the tree as friendly and often as divine. There was the mystic oak of the Druids; the sacred Bo-tree of Buddah; the ash Yggdrasil of Norse Mythology, whose roots were in the underworld, but whose arms reached to the Asa-gods above the skies. How large a part the tree has played in our own Holy Writ, from the Tree of the Knowledge of Good and Evil in Genesis to that Tree upon which the Divine Sacrifice was consummated, I need not, surely, remind you."

In "Roads of Remembrance" municipalities see opportunities not alone for an inspiring memorial, but for the promotion of better feeling with other municipalities. In this campaign, wherever taken up, the American Forestry Association finds that rivalry of the most healthy kind develops between organizations such as chambers of commerce and boards of trade, rotary clubs and like forces for civic betterment. At Tampa, Florida, is found, perhaps, a good sample of the get-together and do-spirit. There the Rotary Club put over a campaign for $7,500 for a "Road of Remembrance." There was no great fuss about it. The thing was just done because the club knows a good thing. The following outline from E. D. Lambright, of the Memorial Highway Committee of the Rotary Club, tells of the plans:

"Hillsborough County is now building many miles of asphalt road. One of these roads extends from the city limits of Tampa to the country line of Pinellas County, and is probably the most traveled of any county highway, as it leads to the resorts and growing towns of the West Coast. Suggested by James Yeates, chairman of the Hillsborough County Commissioners, himself a Rotarian, the Rotary Club espoused a plan to make this road a 'Road of Remembrance.' For fifteen miles, from city limits to county line, it is to be bordered with the laurel oak, more familiarly known as the 'water oak.' Between the oaks will be set out oleanders and various colored flowers. The road will be beautifully parked on both sides and, when the trees reach a sizeable growth, will undoubtedly be one of the most beautiful driveways in the country.

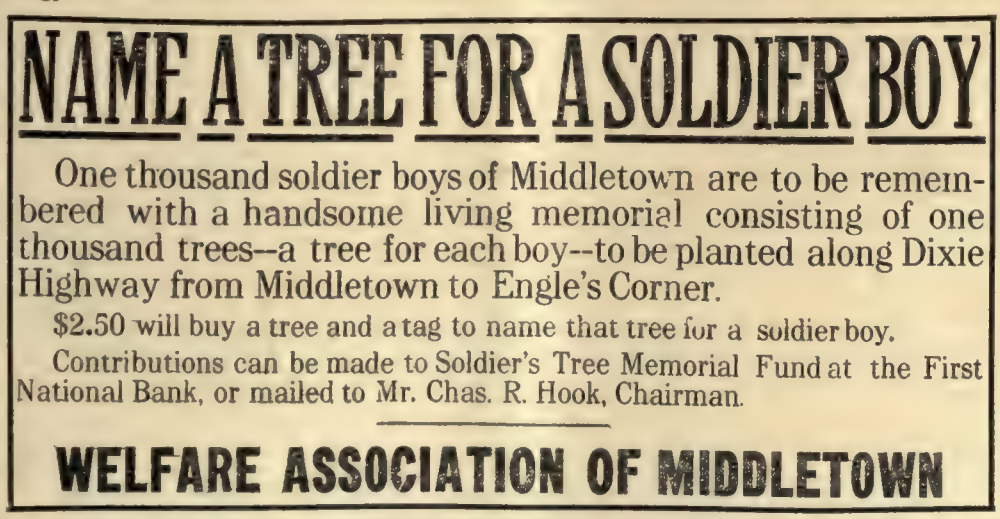
"The campaign for funds to buy and plant the trees was conducted and $7,500 was raised for this purpose. Prospective subscribers were informed that they could buy any number of trees, to represent them on this highway, at $2.50 a tree. Relatives and friends of the boys who gave their lives in the war were thus given the privilege of suitably

IS YOUR TOWN READY FOR ARBOR DAY?

With the coming of Arbor Day there comes a renewed interest in memorial tree planting. The American Forestry Magazine wants all tree plantings reported to it at Washington. The Arbor Days this Spring follow:

Colorado—Third Friday in April.
Connecticut—May, on proclamation by the Governor.
Idaho—April, on dates set by the County School Superintendents.
Illinois—On proclamation by the Governor.
Indiana—Third Friday in April.
Iowa—Proclamation by the Governor.
Kansas—On proclamation by the Governor.
Maine—On proclamation by the Governor.
Maryland—Second Friday in April.
Massachusetts—Last Saturday in April.
Michigan—Last Friday in April.
Minnesota—Latter part of April, on proclamation of the Governor.
Missouri—First Friday after the first Tuesday in April.
Montana—Second Tuesday in May.
Nebraska—April 22, birthday of J. Sterling Morton.
Nevada—On proclamation of the Governor.
New Hampshire—At option of the Governor.
New Jersey—Second Friday in April.
New York—First Friday following May 1.
North Dakota—Option of the Governor.
Ohio—Middle of April, on proclamation of the Governor.
Oregon—Second Friday in April.
Pennsylvania—On proclamation of the Governor.
Rhode Island—Second Friday in May.
South Dakota—Latter part of April, on proclamation of the Governor.
Utah—April 15.
Vermont—First Friday in May.
Virginia—On proclamation of the Governor.
West Virginia—Second Friday in April.
Wisconsin—First Friday in May.
Washington (State)—First Friday in May.
Wyoming—First Friday in May.

Arbor Day, Mr. Pack points out, started in Nebraska when the State Board of Agriculture on January 4, 1872, heard the resolution of J. Sterling Morton that April 10, 1872, be consecrated to tree planting. This was adopted, but later, in honor of the father of Arbor Day, the date in Nebraska was changed to April 22 in honor of Mr. Morton's birthday.



HERE IS THE COPY OF AN ADVERTISEMENT WHICH HAD A BIG PART IN THE UNIQUE CAMPAIGN FOR A "ROAD OF REMEMBRANCE" AT MIDDLETOWN, OHIO

and perpetually expressing their acknowledgment of the 'supreme sacrifice.' The trees are to be fully protected during their early growth and will have the constant attention of experts. At the city limit line, where the memorial highway begins, the city is to erect a permanent and imposing arch, and the County Commissioners are to erect another at the county line, where the 'Road of Remembrance' ends, these arches to bear the names of the heroes they commemorate. The idea has proved very popular and it is assured that Pinellas County will do likewise, joining the Hillsborough Highway with one for its own young men, making at least a thirty-mile continuous stretch."

The keynote is in the last line of the statement which says that it is assured that Pinellas County will do the same. There we have the possibilities for a magnificent system of roads throughout the country when something is started for of course the next county will not lag in this great work. Thousands of dollars have been voted for good roads. This money is to be spent within the next few years. To no country, except France and Belgium, does there come such an opportunity to beautify while building. It is an opportunity that must not be missed. And it will not be if the answer to the call sent out by the American Forestry Association continues to grow in volume. At Middletown, Ohio, a unique campaign for memorial tree planting has been conducted. Mrs. Charles R. Hook, wife of a vice-president of the American Rolling Mill Company, helped in a campaign by the Welfare Association. Half page advertisements were inserted in the newspapers and in quick time a fund for a thousand trees was raised and these will be planted along the Dixie Highway from Engle's Corner to Twelfth Street, in Middletown. Mrs. John B. Hamme has completed plans for the memorial

PLANT A TREE

By DAVID H. WRIGHT

If when I am gone
Thou would'st honor me
Then plant a tree.
Some highway, bleak and bare,
Make green with leaves.
So radiant and fair
And full of leaves my monument will be,
So ever full of tuneful melody.
My monument will be
A sight most rare—
Trees planted everywhere.
A highway broad from city to the sea—
Plant this in memory of me.



CEREMONY AT THE MEMORIAL TREE PLANTING OF THE ARS ENAL TECHNICAL HIGH SCHOOL AT INDIANAPOLIS, INDIANA

tree planting along the Lincoln Highway, twelve miles each side of York, Pennsylvania. Mrs. D. P. Montague and Miss Mollie E. C. Montague have completed plans for tree planting along the Dixie Highway out of Chattanooga. At Brooklyn, New York, plans have been put forward for a memorial highway as part of a great civic plan that will mean the making over of much of the great city. Anna T. Graham, Home Service Secretary of the Red Cross at Milton, Florida, reports the planting of twenty memorial trees and in the dedication the Federation of Women's Clubs will take part. At Appleton, Wisconsin, the High School has planted six memorial trees, under the direction of Paul G. W. Keller, the principal.

These are but a few of the varied organizations that have turned to memorial tree planting. Has your town a plan? Is there an opportunity for a memorial highway or a memorial park? What about a "Road of Remembrance" to the next town? Make tree planting by the citizens a part of any memorial plans. Give your memorial the proper setting of memorial trees. Give the citizens something to do besides pay the bill. Let him have a part in the work and the result will be better citizenship and he and his children will hold to that community just as does the tree they plant.

THE ADOPTED SON OF THE TWENTIETH ENGINEERS (FOREST)

IT is not generally known that our now famous regiment of forest engineers adopted one of the fatherless children of France, but this is a fact and his photograph is here shown. He was from a gypsy family, says the Rev. Howard Y. Williams, Chaplain of the Regiment, in reporting the matter to the American Forestry Association, and had never been in a home up to the time he was adopted. He had never walked up-stairs, and was really frightened by the first experience. Now he is well clothed and cared for, going to school every day and twice a week to church to learn the catechism. Both his schoolmaster and the local priest give very favorable reports of his progress. The following letter from Miss Marie Faguet, daughter of the Supreme Court Judge of the Department, is interesting. Miss Faguet is looking after the orphans and fatherless children in her father's Department, being a representative of the Society for Fatherless French Children. Anyone interested in the two other cases she mentions may correspond directly with her at 14 Rue de la Grandiere, Tours, France, as she reads and writes English, or with the editor of this magazine.

Tours, France, December 3, 1919.

My dear Chaplain:

Some days before my departure from the country to Tours, I took the picture of Jean Doer, which I send you in this letter so you can know this little boy, to whom you are so good and so kind. I regret very much that you had not met Jean before your departure to America. Very often I speak about you to Jean, who would be so glad to know you. Will you come soon to France? Every day Jean Doer goes to school, and twice a week to church to learn the catechism. The schoolmaster and the priest say to me that Jean is a very wise and intelligent boy.

Always I take care of the young orphans of Argy. Many are adopted by the Americans. But there are two who are very poor; a little girl of two years old, Emiliene Cihault, and a boy of six, whose name is Ernest Deloleuf. Do you know some American people who would like to adopt these two children? The mothers are working very hard and they are very honest families.

My sister and brothers join me in kindest remembrance.

MARIE FAGUET.

By adoption, Miss Faguet does not mean legal adoption, but simply the willingness to take an interest in the child



JEAN DOER—THE ADOPTED SON OF THE TWENTIETH ENGINEERS (FORESTRY)

through yearly subscription and such letters as one may desire to write. Fifty dollars a year is all that is needed for a child like either one of these two, who is living at home with the mother, and the subscription may be for one year or longer.

THE POPLARS

Now with the breath of coming rain
The poplars sway in troubled row,
Like old wives, rocking to and fro
In pain;
They shake their heads in shocked surprise
And whisper underneath their breath,
Like mourners in a house of death;
Then lift their aprons to their eyes
Again.

—Nellie Burget Miller.

MUNICIPAL FORESTRY IN NEW YORK

BY JOHN BENTLEY, JR.

PROFESSOR OF FOREST ENGINEERING, CORNELL UNIVERSITY

THE practice of forestry by municipalities abroad is not uncommon, and no doubt many travelers are familiar with the "town forests" of Europe. One of the best known of these is the communal forest belonging to the city of Zurich, in Switzerland, which has an area of 2,840 acres, yielding on the average an annual income of nearly $20,000, or about $7.00 per acre; and this is the more remarkable because most of this income is derived from the sale of firewood, which is perhaps, the cheapest product of a forest. This tract of forest land has been under management since the year 1309, and it has been steadily increasing in value during these six centuries. In this country the number of towns and cities that are practicing forestry is still small, and their efforts have been confined chiefly to the protection of watersheds from which the city's water supply is drawn. The state of New York passed a law in 1912 making it possible for counties, towns and villages to acquire, by purchase, lease, gift, or condemnation, lands having treegrowth or forests thereon, or lands which are suitable for the growth of trees; and while this law may have encouraged the practice of forestry to some extent, it is a matter of regret that more of the non-agricultural land in the state is not put to use in this way. The advantages to be obtained are numerous, besides the income to be derived from the sale of forest products there are the benefits of regulation of stream-flow, protection of the watershed, shelter from winds and storms, protection to birds and game, and a healthful resort for the people of the town and community.

Sherburne, a village in Chenango County, New York, has been planting trees systematically since 1912, and the work was begun without the knowledge that state laws were being enacted which might make tree-planting something of an inducement. It therefore deserves all the more credit for its interest in forestry. To Dr. Homer G. Newton, for many years a resident of that village, is due the honor of having initiated the policy of tree-planting and watershed protection, for he it was who gave the village a tract of land surrounding its reservoirs and bordering the stream for some distance above them, and he it was who foresaw the necessity of having these lands forested, if the water supply of the village was to be conserved and protected to the best advantage. Accordingly, the terms under which the village came into possession of this watershed provide for the removal of all buildings, and the planting of ten thousand trees each year for five years (or until 1917), and four thousand trees annually, thereafter, until the entire area of ninety-five acres is forested. If openings occur where the planted trees fail to establish a stand, such spots are to be replanted, and the work is to be continued until the whole tract is covered with a thrifty growth of forest trees. In its conception and in its execution the plan is an admirable one; and the wisdom of it bears testimony to the thoughtful generosity of the man who is responsible for it. Moreover, as time goes by and the trees grow into a dense forest, the Reservoir Park, as the tract is to be known, will stand as a perpetual memorial to its donor, a memorial of practical value and natural beauty which can be appreciated and enjoyed by every resident of the town. It is earnestly hoped that this example will be followed, and that many other towns in New York and other states will establish and maintain municipal forests.



A FINE INDIVIDUAL SPECIMEN

Scotch Pine planted 10 years ago, and now 15 feet high. In the last two years this tree has grown 40 inches.

Chenango County is a region of great natural beauty; the hills and valleys combine to make one of those picturesque counties for which central New York is famous. Mad Brook, a small stream rising a few miles to the northeast of Sherburne, meanders through open fields and drains a watershed of more than a thousand acres; it supplies two reservoirs located about a mile from the town. On the banks of the stream is a growth of willows, and the moist lands bordering the stream are being planted to ash, spruce, and other trees which find the conditions favorable. Above the stream, the country slopes up to a hill on which is a body of mature timber, a remnant of the vast forest which originally covered the hills of Chenango County. In these forests, pine, hemlock, maple, beech, ash and birch reached large sizes, and contributed greatly to the natural resources of the country. But few of the pieces of woodland now remaining give any idea of the original magnificence of these forests; agriculture and stock-raising have demanded open, cultivated fields; and the forests were largely cut down. In some parts of the surrounding country, however, agriculture has been attended with so little success that a second growth of timber is rapidly taking possession of the ground, and the proportion of woodland is actually increasing. Wherever tree-growth occurs on this watershed it is, of course, being protected and encouraged, and the open spots that occur will eventually be filled up by planting appropriate species of trees, if they have not already succeeded in establishing themselves by natural seeding.



SCOTCH PINE PLANTED IN 1910

Mr. R. P. Kutschbach, of Sherburne, N. Y., who is in charge of the plantations, is standing beside the trees, which average 12 feet in height, some of the more vigorous ones reaching 15 feet.

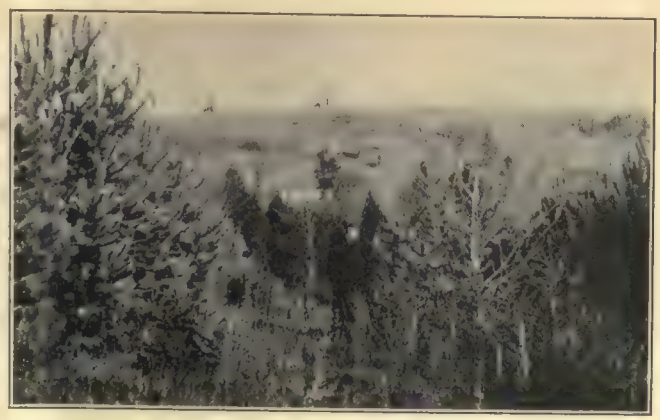


AT THE EDGE OF A WHITE PINE PLANTATION

These trees have been planted 10 years, and average about 9 feet in height. The growth during the last two years has been especially good, and the tallest trees will reach a height of 12 feet.

The hillsides about the resorvoir abound with springs which, of course, would flow more copiously and with greater regularity if the slope were fully protected by a cover of forest trees; and since water conservation is the main object in view, one of the most important functions of the Reservoir Park is to safeguard these springs, which help to keep the reservoirs filled.

The varied topography and exposures give rise to quite a wide range of soil conditions, especially as regards moisture; this affords an opportunity to employ several species of trees for the work of reforestation, chief among which are white pine, red or Norway pine, Scotch pine, Norway spruce, white ash, cottonwood and red oak. All of these species have been tried, and observations have been made to determine their relative merits under the existing conditions. Owing to the fact that some of the earlier plantations of white pine have been attacked and damaged by the white pine weevil, red, or Norway pine and Scotch pine, which are not subject to the attack of this insect, have been substituted for white pine during the last few years. The white pine weevil is an insect that attacks the growing shoot of the tree, causing its death. The effect is to force one of the lateral branches of the tree to become the leader, and although the tree itself rarely dies, it is always forked or crooked, as a result of the insect's work. Red oak was tried in 1915 on the drier hill tops, but has not given the satisfaction that was expected. Hemlock, one of the most abundant of the trees in the original forests, is found reproducing exceedingly well and is reclaiming considerable territory along the edge of the woods, and although this species is slow in growth, it will be left where it occurs naturally, because it is so well adapted to the conditions.



NORWAY SPRUCE PLANTED BETWEEN ROWS OF WHITE PINE

While making fairly good growth during the last two seasons, the spruce has taken many years to become established. The quality of the soil here is better adapted to pine.

The tree planting has been done with mattocks, the men working in crews of two. In this method of work,

one man digs a hole, and his companion follows, setting the trees, a supply of which he carries in a bucket. The trees are spaced at regular intervals of six feet along straight lines which are themselves located six feet apart. This makes a total of 1,210 trees per acre. The spacing in the plantation is kept as regular as possible to facilitate the present work of planting, as well as to make counting and future management easier. A considerable portion of the area has already been planted, and at the present rate of planting the watershed will be covered with trees about the year 1922. From that time on, it will be necessary to fill up any fail spaces, should they occur, and to practice some system of silviculture which will best subserve the purpose for which the park was established.

Although located some two or three miles from a railroad the danger from fire is not to be underestimated; the popularity of camp fire suppers, and the carelessness of smokers have been responsible for many a fire which has damaged or destroyed forests generally considered outside the danger zone. Every precaution will be taken in the case of this plantation to avoid damage by fire. This will be accomplished by establishing fire-lines along those portions of the park which are most exposed, and by frequent patrol and inspection during dry and dangerous seasons. A set of fire-fighting tools will be kept where they can be gotten quickly, in case of an emergency. More effective than anything else, perhaps, will be the education of the people to a sense of their own responsibility in protecting a park which is maintained for the public benefit. When the people in a community come to regard a forest park of this kind in the same light that they regard their own personal property, there will be little trouble in securing effective fire protection.

To many people, the question of costs is the most important of all considerations. If the project can be shown to pay returns on the money invested, it will appeal to everybody concerned as sound business. It has been shown in a number of cases that forest plantations will yield very satisfactory financial returns under fair conditions* The conditions under which the planting has been done at Sherburne make the prospects for ultimate financial success very good; unless some unforeseen accidents occur, a profit of from 4 to 6 per cent may be expected at the end of forty or fifty years at which time the plantations should contain a large proportion of merchantable trees. Up to 1915 the average cost of planting, including stock, transportation, labor, and inspection, had been $9.71 per thousand trees, or $11.75 per acre. The work in the last four years has approximated $13 per acre. This is a very reasonable figure considering the conditions existing at the Park.

The development of this project should be followed with much interest by towns or villages that contemplate similar plantations or forests.‡

FINANCIAL STATEMENT OF THE AMERICAN FORESTRY ASSOCIATION FOR 1919

EXPENSES

Publication of Magazine	$26,230.11
Membership Solicitation	7,905.92
Business Office Expenses, General Supplies, Equipment and Salaries	22,457.66
Meetings	681.19
	$57,274.88

INCOME

Membership and Circulation	$42,110.60
Advertising Income	7,555.90
Books Sold	270.18
Paper Sold	53.22
Fire Loss Adjustment	5,734.90
	$55,724.80
Operating Loss	1,550.08
	$57,274.88

ASSETS

Cash	$ 7,120.33
Investments	26,314.33
Accounts Receivable	1,257.58
Inventories	207.00
Deferred Assets	1,770.00
	$36,669.24

LIABILITIES

Association Bond Outstanding	$ 10.00
Accounts Payable	6,954.43
Notes Payable	5,000.00
Surplus January 1, 1919, plus net profit of $299.79	24.704.81
	$36,669.24

Funds donated to American Forestry Association for Educational and Scientific Work in 1919 and not included in above Financial Statement $103,934.00

Expended as follows:

Forestry Publicity and Propaganda	$ 5,600.00
Foresters Edition (American Forestry)	1,000.00
Printing and Distribution of Bulletins and Pamphlets	3,995.00
Educational and scientific work through the Conservation Department affiliated with the National War Garden Commission from January 1, 1919, to completion of this work on June 1, 1919	93,239.00
	$103,934.00

During 1917 the American Forestry Association received gifts for educational and scientific work through the Conservation Department, amounting to	$ 56,700.00
During 1918, for same uses	228,500.00
During 1919, to June 1, when this war-time work ceased	93,239.00
	$378,439.00

This total sum was expended through the Conservation Department affiliated with the National War Garden Commission, and is a part of the "war-time," patriotic service of the American Forestry Association.

WEASELS AND THEIR HABITS

BY DR. R. W. SHUFELDT, C. M. Z. S.

NOTWITHSTANDING the fact that there are many species of weasels, their habits are quite similar. The principal differences are due to climate, to the character of the country in which they live, and to food. The habits of the black-footed ferret (Fig. 1), the largest of all the American weasels, are different from those of the least weasel (Fig. 3)—the smallest of the type. The smaller weasels are decidedly more slender, with longish, cylindrical bodies and snake-like aspect, the animals themselves being extremely active and muscular, while the larger species are more robust and rather less active.

All the weasels. and there are upwards of forty species of them, are distinctly carnivorous; and so far as the writer is aware, it is not known that they ever touch anything else, as berries, or any herb or vegetable growth. All of the smaller weasels live principally upon mice, and these they are able to follow straight down into their holes. Through such places they squirm in and out with as much ease as the mice themselves, the latter being thoroughly terrorized when it becomes known to them that there is a weasel in the neighborhood. In the northern regions the larger species prey chiefly on rabbits and lemmings, and on some birds of a corresponding size, while further south the big, long-tailed weasel subsists largely on chipmunks, gophers, and other rodents of equal size.

No mammal in the entire world, great or small, can compare with the weasels as hunters. They hunt their prey incessantly, following it by scent, and take the lives of a far larger number of victims than they need for food. They kill, and keep on killing, just for the fun of it; and it is only during the cold winter weather, when game becomes scarce, that they conceal for future consumption the bodies of some of the animals they have slain.

When deer mice and other small animals are abundant, a weasel makes great havoc among them, killing one after another, merely to suck a part of the fresh blood, and then abandoning the bodies for some other animal to pick up and devour. On several occasions the writer has seen weasels chasing deer mice on the snow; and as one of the latter is by no means a poor leaper, almost as good as the weasel itself, such a chase becomes quite interesting. It is extremely rare for the mouse to make good its escape; for, even should it reach an old stone wall or other place of refuge, the bloodthirsty hunter follows directly after it, squirming his way through crevices and chinks, and among stones, with surprising ease and rapidity, until at last one hears from within the dismal squeals of the captured mouse, announcing the result of the run. The writer once shot a New York weasel (Fig. 10) in the very act of capturing a mole, and the stench that the former was guilty of was something dreadful; in its way it was almost as bad as what a skunk accomplishes under similar circumstances. When hungry, and intending to



ONE OF THE RAREST AS WELL AS ONE OF THE LARGEST WEASELS KNOWN IS THE BLACK-FOOTED FERRET (*Putorius nigripes*).

Fig. 1. This specimen is in the exhibition series of the United States National Museum. It is a large animal, and its general coat is of a pale clay color, except the tip of its tail and its feet, which are black. It possesses all the habits of its kind, and is doubtless a perfect terror to the small mammals of the regions it inhabits.

THERE ARE QUITE A NUMBER OF SPECIES OF WEASELS ON THE PACIFIC COAST, AND THIS FORM IS ONE OF THEM

Fig. 2. This long-tailed, long and slender species is known as the Washington Weasel, being an inhabitant of that State (*Putorius washingtoni*). It is also in the National Museum exhibition series.

eat the mouse it has taken, the weasel will first suck all the blood it can from the body of its victim through the jugular veins at the neck. It will then bite through and lift the vault of the skull, and get away with the brains, of which it seems very fond. Next it pulls back the pelt from the fore parts towards the tail, eating as it goes, until nothing remains but the reversed hide, to which dangle the four feet and tail. Sometimes weasels



IN THIS CUT WE HAVE ONE OF THE SMALLEST SPECIES OF WEASELS KNOWN (*P. rixosus*); ITS TOTAL LENGTH BEING ABOUT 12 CENTIMETERS.

Fig. 3. This interesting little animal has a range from Hudson's Bay to Alaska and from Northern Minnesota to Montana. It is a light fawn color above and white beneath.

capture shrews in wet places, and no end of meadow mice in the old corn fields and pasture lands. As for rats and common mice, the writer has known a pair of weasels to rid a big barn of them in less than one week. During their stay one or the other of them would frequently be seen in broad daylight; they evinced no fear whatever of one's presence, especially after they fully appreciated the fact that they would not be molested.

In killing gray or other rabbits, larger weasels run them down, jump upon their backs, and inflict the death wound by a bite just back of the ear. Sometimes hunters or others have witnessed these tragedies, and have taken the rabbit for their share—the weasel being in some cases lucky to get off with its life. While the chase is on the rabbit will often give up, and, squatting down, commence to squeal in the most pitiful manner, until its merciless hunter takes its life. Of course, were the rabbit not so terrified—its heart nearly bursting with fear for its life—it could easily escape, for no weasel living could overtake a rabbit on a stern chase run. Occasionally when a weasel meets a rabbit in the woods, the latter will run as fast as he can into some adjoining field or open space, and thus escape his enemy, who rarely follows him under such conditions, although there are exceptions to this. And then, could the rabbit but realize it, it is just possible that if it put forth the strength of which it is capable, it could readily tear such an insignificant creature as a weasel into bits. Even a big rat will sometimes stand off a weasel successfully, especially when defending its young.

Well known instances have occurred where a large hawk or owl has seized a weasel in its talons, and suddenly, while soaring off with its captive, realized its mistake too late. The weasel, squirming about, at last fastens his teeth in the body of his captor, and, cutting some big vein, soon deprives him of his life, both coming down together—the hawk or owl quite dead, while the weasel often runs off with only a few scratches, and none the worse for his trip aloft.

It is said that in England the weasels sometimes hunt in little packs consisting of a dozen or more; and that there are well authenticated cases of their having resented the interference of man, promptly attacking the latter, and absolutely placing him in danger of his life. One can easily imagine how they might do this; eight or ten agile weasels would be very hard to keep at bay, particularly as they, by instinct, make at once for the veins of the neck; for them to run up a man's clothing would be



THE OLD PIERCE'S MILL, PIERCE'S MILL ROAD, WASHINGTON, D. C.

Fig. 4. Not so many years ago, and to some extent still, many of the small mammals of this region—weasels among them—occurred in the woods close to this historic old building. (See figure 6.)

no trick at all. Their teeth are like lancets; they are extremely persistent in any attack they undertake, and a simultaneous one of this character would undoubtedly give them additional courage.

During the summer weasels will also feed upon crickets, grasshoppers, insects of various kinds, and every bird's egg they can reach, together with the birds, both big and little. Quails, meadow larks, and ground-building birds of every kind, constantly fall victims to these little blood-sucking hunters. It has been said that a weasel is so agile that it can sometimes capture a bird after the latter has taken flight (Fig. 10); this it does by quickly springing into the air after it with a bound. The strength and agility of these animals is really something wonderful, and there is no end to their fight and pluck. When cornered they will squeal most shrilly; but this is more in defiance than fright. The writer has known one to get into his henhouse and murder a dozen hens upon the

roost at night. The weasel was content to take only a bite or so from each head and suck all the blood he could, escaping down a rathole, and being smart enough not to come out again while the writer was there with the lantern. But after all, the service these little rascals render about the barns and outbuildings, in the way of destroying scores upon scores of rats and mice, far more than compensates for the loss of a few hens. In short, we may believe with Benjamin Scott that "if considerations of profit and loss are to determine, according to modern tendencies, the fate or the survival of our smaller wild birds and quadrupeds, we cannot too strongly inculcate the doctrine that nothing is really gained by destroying the balance of nature; while the extinction even of an animal so apparently insignificant as a weasel would be a loss, not to be repaired by any supposed utilitarian advantage to those who, in reverent pursuit of natural science 'love to view these things with curious eyes, and moralize.'"

The writer has several times caught the New York weasel in a box trap, and it is remarkable to see how gentle they are when taken captive; they do not seem to know what fear is. Witmer Stone once caught a female specimen of the same species in this way, and said that "within less than an hour from the time she was first removed from the trap to her cage, she would take meat from my hand without the slightest hesitation, and never offered to bite my fingers even when touching them with her nose. This tameness could not have been brought about by hunger, for when I found her in the box trap she had not wholly eaten the rabbit's head which I had used for bait."



OTHER SMALL WEASELS, OTHER THAN OUR LEAST WEASEL (Fig. 3), OCCUR IN OUR WESTERN TERRITORIES, AND THIS IS ONE OF THEM

Fig. 5. This one has received the name of Puget Sound Weasel (*P. streatori*), and it is to be met with along the coasts of Oregon and Washington.

A weasel's nest is generally made up of old, dried leaves or grass, and rendered warm, dry, and comfortable. It is usually placed in the hollow root of some dead tree, or in a hole in a bank somewhere. At other times they select the burrows of other animals, as chipmunks, rabbits, and gophers, frequently killing and devouring the rightful owner prior to occupancy.

Weasels are very prolific, in some regions having two or three litters a year, and from three to five weaselets to the litter. Females, which in some of the species are considerably smaller than the males, are fearless to a fault when called upon to defend their young. Regardless of the size of the assailant, she will at once fly at him, be it man, dog, or feathered foe, and she is quite ready to sacrifice her own life in defense of her precious young. From all we can gather, it would appear that the period of gestation in any of the weasels is between six and seven weeks. In the Southern States they breed earlier than in the North. Along the southern border of the United States the young may be produced as early as the latter part of March; we may count a month later for the middle districts, while those in the far north are not produced until well into the month of May. When unencumbered by the cares of a family, weasels become great travelers, and will, even in the space of one night, wander several miles. This they will continue to do for a month or more.

The New York weasel, like others of its kind in the northern geographical ranges, assumes a pure white coat on the approach of winter, the tip of the tail alone remaining perfectly black, as it does throughout the year. In the summer the upper part of its coat and the feet are of a deep chocolate brown. To a moderate extent this encroaches on the lower part, the latter being white, faintly shaded with pale yellow. In winter this pale yellow may become persistent on the lower parts of the animal, but not invariably so. As spring approaches, the weasels, in shedding their coat, present a mottled or pied appearance; and in some of the southern districts the change from the pure white to the summer coat is said to be never quite complete, as it always is with typical northern forms. Usually it is the end of the tail that remains black, and this is strikingly conspicuous when the remainder of the coat is white. It is rendered still more so as the animal passes over the snow. Under these conditions the black tip may be of service to a weasel, for it is this which, above everything else, rivets the gaze of the beholder. One sees the black pencil of a tail only, as the white and hard-to-be-seen creature flees over the fresh snow. Doubtless this likewise holds true for the enemies of the weasel among the owls and hawks and others.

Were a hawk, for instance, to pounce upon one of these little fellows, he would naturally attempt to seize with his talons the part most evident to his sight—that which held it and influenced the effort to capture. A

miss would often be the result and the fleeing weasel would escape.

There are those who believe that the black tip to the weasels tail in the summer coat also has its advantages, and these redound to the young; for by its aid they can follow their mother better as she rapidly passes through the mixed undergrowth of the weasel's haunts, especially



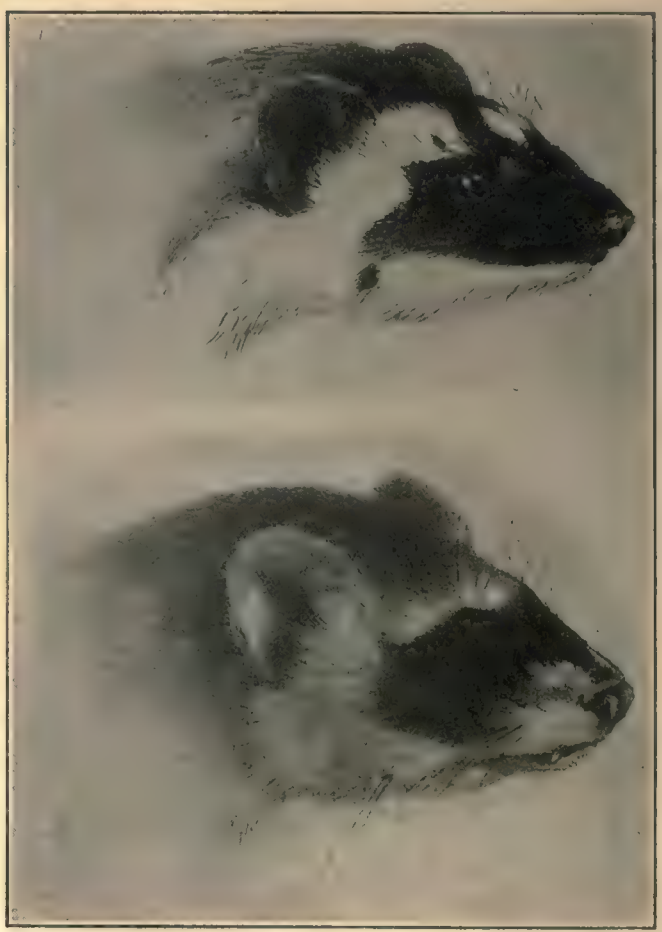
SUCH SCENES AS WE HAVE HERE STILL EXIST CLOSE TO THE NATIONAL CAPITAL.

Fig. 6. To meet with fresh weasel tracks on this snow should not surprise one, for the section is plenty wild enough for them, and there is no end of their food to be met with in such localities.

where it is composed of a great variety of plants, brambles, grasses, and the like, under which conditions a black spot to constantly fix the attention would, in this case be of great assistance.

When seen on any surface, as snow or soft mud, the footprints of a weasel are characteristic and easily recognized. It progresses by bounding leaps, clearing intervals to suit its purpose and convenience. In landing, the hind feet come nearly squarely into the tracks made by the front pair. Thus we have the little impressions it makes in pairs, side by side, and rather close together, each track being produced by the imprint of the fore foot pressed down by the hind foot following it on the same side. The ordinary leap of the animal rarely exceeds a foot and a half; but if badly frightened it can clear ten or a dozen feet at a bound, landing with great certainty in the very spot it desires to reach.

There is another notable fact about weasels rarely described by naturalists and not generally known; here is an instance of it. On one occasion the writer was in his barn on a bright, sunny morning, when a fine male New York weasel ran across the floor. He ran up on some barrels of grain, and out on a heavy oak crossbeam, in front of one of the horse stalls. Being close to him, he had no means whatever of escaping beyond jumping over the writer's head, or, in the other direction, onto the horse. Having the threshing-end of a heavy oak flail in one hand, the writer, partly in fun, partly in earnest, with careless aim struck a blow at him. The blow was a miss, and the end of the flail hit the beam a fraction of an inch below where he had quietly stood. He disappeared like a puff of smoke. During subsequent years and in substantiation of later observations, the writer learned that this was quite a trick or the weasel's. Others have noticed it, as for example Stone and Cram, who say in their "American Animals" that, "though bold and fearless, they have the power of vanishing instantly, and the slightest alarm sends them to cover. I have seen one standing within reach of my hand in the sunshine on the exposed root of a tree, and while I was staring



UPPER HEAD, THE BRIDLED WEASEL; THE LOWER ONE IS THE BLACK-FOOTED FERRET

Fig. 7. These are typical members of the weasel group in this country, and were originally drawn by Mr. Ernest Thompson Seton. Pugnacity and ferocity is seen in every feature of either of these heads.

at it, it vanished like the flame of a candle blown out, without leaving me the slightest clue as to the direction it had taken. All the weasels I have ever seen, either in the woods or open meadows, disappeared in a similar manner."

Just how well off the American museums are today for specimens of the black-footed ferret, I am not pre-

pared to state; but I do know that some thirty years ago there were only a very few of them in the collections. This large weasel spends not a small part of its time during the day in the burrows of various animals—more particularly those of the prairie dog or prairie marmot, an animal upon which it frequently preys. This species is said to closely resemble the polecat of Siberia. The two differ in only a few not very important characters, our form having somewhat longer ears, shorter and coarser fur, added to some differences in its skeleton. It is at once recognized by the transverse black band across the face, encircling the eyes, and by its black feet, which color is carried somewhat above, or at least up to the wrist and ankles. We know but little of its life history, and contributions to the subject would be of value. The big prairie dog towns in the southern part of Wyoming and northern Colorado are good localities in which to hunt for specimens. In general coloration the animal is yellowish brown above, white beneath, tinged with yellow, the colors shading into each other on the sides and rump. The nose, sides of head, ears, throat, lower surface of neck, belly, and under side of tail, all white; about two inches of the distal end of the tail are black.

Another interesting weasel is the long-tailed weasel—a large species with an uncommonly long tail (Fig. 9). This animal is of a pale yellowish brown above, being darker upon the head. Its upper lip and chin are pure white, the end of its tail black, feet yellowish buff. It turns white in winter, as do other weasels. In northern Montana and along the upper Missouri this species is found inhabiting the burrows of the kit foxes, the gophers, and the badgers. This is a desert region; but where the animal is found in the mountains—as among the Wahsatch—it is seen to be a tree climber, where it is apparently as much at home as a pine marten. These weasels are capable of giving off a very powerful and fætid stench; but they are nevertheless captured and devoured by some of the larger species of hawks, and even fed by the latter to their young. It is quite an abundant species in some localities, and by no means as retiring as the black-footed weasel.

Our bridled weasel of southern Texas is another large and very handsome species with a long tail. Most of its head is black, with elegant white markings (Fig. 7), shading into dark chestnut brown on top. This is continued in a rich shade over the upper part of the body. the chin and throat being whitish. It is a yellowish orange beneath, and the tail has merely a black tip. It is believed that this form does not turn white in the winter; and, while it has many of the habits of its congeners, we still stand in need of a full account of its life history.

We have another very interesting member of this group in Bonaparte's weasel, with its two subspecies, Richardson's and the Juneau weasel. These forms are also known as ermines and stoats. The ermine or stoat of Europe is known to science as *M. erminea,* and for a number of generations it has been known to many observers, as well as to naturalists, furriers, and others. It is of great value economically, as its pelt forms one of the staple products of the fur trade, and could, in Europe at one time, only be worn by members of the royal families. This law held especially in Russia, where ermine tails were principally used for such purposes.



A FINE MOUNTED SPECIMEN OF RICHARDSON'S WEASEL IN THE EXHIBITION SERIES OF THE UNITED STATES NATIONAL MUSEUM (*P. c. richardsoni*) AS IT APPEARS IN ITS WINTER COAT

Fig. 8. Richardson's weasel has a black-tipped tail in winter, as almost all weasels possess in their winter pelage.

In summer, Bonaparte's weasel is of a dark brown color above, the under parts and upper lip being of a yellowish white. One that the writer saw caught in a box trap was in winter pelage, and one of the most beautiful little creatures imaginable—more attractive than beautiful perhaps, in the sense we would use the latter word when describing a mammal with a pelage exhibiting some bright color.

A considerable amount of discussion has appeared in various works devoted to the life histories of mammals in regard to the mode of change of the color of the hair of the coats of those animals that exhibit summer coloration, and then, with more or less suddenness, don one of white, or nearly white, for the winter season. Weasels that do this have come in for their full share of the various opinions held by zoologists. Some believe that one of these animals, in changing to the white pelage of winter, sheds the fur, the coat of white being entirely new. Others have contended that owing to a certain falling of temperature at the beginning of winter, the coat of the weasel simply turns white, the hair not being shed at all; while still others affirm that it is due in part to this, and in part to the old coat being, to some extent, replaced by the winter one or *vice versa*. In other words, there are in general two ways in which the change may take place. Those who have studied the question most closely contend that the change may or may not be coincident with the shedding of the coat. Such an opinion is based upon the fact that, in examining a large series of specimens, examples have been met with wherein the white hairs have been found to be tipped with brown, with a dark brown stripe of new hair down the back, being a part of the incoming spring coat. Autumnal specimens show the former condition and vernal ones the latter. Temperature markedly affects it, and to a large extent is the controlling agent. This is supported by the fact that the northern species only assume the complete white coat in winter, while the extreme southern forms never exhibit any such change. Species ranging in the intermediate regions are often piebald, and remain so until the shed gives them a new coat of the summer season—that is, the bi-colored one. Under ordinary circumstances, the change from the white coat to the summer pelage takes about three weeks; but this may be retarded or hastened by the conditions of the temperature in the early spring months.



SOME WEASELS ARE TRULY BEAUTIFUL IN THEIR WINTER COATS—DOCUMENTARY EVIDENCE HEREWITH. (Photograph by the author of the Long-tailed Weasel, No. 102089 in the United States National Museum. Somewhat reduced.)

Fig. 9. On account of its long tail, science has named this species *Putorius longicauda*, and it has a range over the great Plains from Kansas northward.

The change is of marked service to the animal. The white coat largely protects the weasel against its enemies, while it serves to render it inconspicuous and difficult to be seen by its prey. The colors also equalize the temperature of the animal's body. A great authority and close observer of the phenomenon states that "it is too well known to require more than an allusion that, although the darker colors absorb heat to a greater degree than lighter ones— so that dark-colored clothing is much warmer than light-colored when the wearer is exposed to the sun's rays—the radiation of heat is also never greater from dark than from light-colored surfaces, and consequently the animal heat *from within* is more completely retained by a white than by a dark covering. Therefore,

the temperature of an animal having white fur would continue more equable than that of one clothed in darker colors, although the latter would enjoy a greater degree of warmth while exposed to the sun's influence. Thus the mere presence of a degree of cold, sufficient to prove hurtful if not fatal to the animal, is itself the immediate cause of such a change in its condition as shall at once negative its injurious influence."

Our ermines are prolific breeders, and may bring forth as many as six or seven at a birth; in the extreme north this may take place even before the female has assumed the summer coat. She usually selects for her home any convenient excavation in the ground, or among the rocks, or cavities in the trunks of trees. The breeding season depends to some extent upon the latitude, being later in the far north than in the more southern parts of the range of the species. The female specimens of the ermine are markedly smaller than the males, although they possess all the characteristics of the species, including the presence of the anal glands and the power to make themselves offensive through their use.



SO AGILE ARE OUR WEASELS THAT THEY ARE ENABLED TO CAPTURE SMALL BIRDS ON THE WING

Fig. 10. This spirited scene is one of frequent occurrence in the northeastern part of the country. The birds are common snowbirds (*Junco*), and the voracious little weasel is in full winter fur. (Photograph by the author of the drawing of the New York weasel by Leon L. Pray in Cory's Mammals of Illinois and Wisconsin.)

It is remarkable what big creatures an ermine will attack and sometimes overpower. The writer believes it was Nelson who stated that in the far north the Juneau ermine will, with ease, overcome a ptarmigan or any of the large northern hares. He simply runs them down, jumps on their backs, and a few bites at the neck closes the tragedy. To suck as much blood as his fancy dictates is the next operation, when his inborn cruelty impels him to seek other victims to satisfy his rapacious appetite. Indeed, if one has ever had the opportunity to corner an ermine in some cavity or other, and looked in upon the little bloodthirsty vagabond, his face is a very good index of this character; it is stamped with the very personality of cruelty and power. His lancet-like teeth may grin at you; he glares at you, while his small eyes seem to actually glisten with a greenish light, intensifying their penetration and cunning. He has all the appearance of the deadly rattler about to strike, and fortunate it is that he lacks the material in his organization to render the bite a venomous one.

In America ermine skins are but little sought in the fur trade, as the demand for them is small. In the Yukon region the natives hardly think it pays to trap them, so limited is the call for their pelts. Our Indians in the north use the tails or even the skins of the entire animal in their ceremonial attire, or attached to some of their implements and fetiches.

In closing the article the writer desires to express his thanks to the National Museum authorities for the facilities extended in the matter of photographing specimens of mounted weasels in the exhibition series of that institution, and more especially to Dr. James E. Benedict, Chief of Exhibits, who, upon this and numerous other occasions, did all in his power to see to it that everything necessary to the accomplishment of such a piece of work was promptly made available.



THE BOY TOSSED A DELICIOUS CABBAGE LEAF TO MAMMY COTTONTAIL AND HER MOUTH WATERED AFTER THE LONG, COLD WINTER, WITH ITS HUNGER PAINS AND FEAR OF DEATH

MAMMY COTTONTAIL AND TROUBLE

BY ALLEN CHAFFEE

AUTHOR OF

"THE ADVENTURES OF TWINKLY EYES," THE LITTLE BLACK BEAR

(WITH ILLUSTRATION BY PETER DA RU)

III. A VISIT TO THE VALLEY FARM

THE cabbage the boy was throwing to the chickens had been frozen, but that made no difference to Mammy Cottontail. It was a delicious odor for a bunny hungry enough to eat dry bark. And her moutn watered at the thought of how a leaf would taste. How long the winter had been, with its cold and hunger and its fear of death, as one enemy after another had tried to catch her.—And memories came of the long summer days in the cabbage patch in the clearing, when she had feasted fat all day long, hiding under the giant leaves. There, not even the boy from the Valley Farm could find her, when she chose to play hide and seek.

Wriggling her little black nose this way and that to sniff that cabbage aroma, she ventured around the old stone wall and across the snow that had drifted over the barn-yard fence. It was a cheery scene. Not only were the chickens clucking over the unexpected meal of green stuff, but the cows and sheep and horses in the barn were munching and crunching and enjoying their suppers, as the boy passed from one stall to another.

Even Lop Ear, the Hound and Barnyard Thomas had their bones, which they mouthed with much growling and licking of chops as they eyed one another.

Mammy Cottontail crept just behind the gate post, and there she crouched, so motionless that the boy had to look twice before he realized she was not just a knobby little chunk of wood.

When he did see her, he tossed a juicy cabbage leaf her way.

"Hello, there, is that you, Bunny?" he called softly. "I'll bet you came because you smelled the cabbage, didn't you?"

This was too much for Mammy. She didn't understand the words, but she did his action, and she crept a little nearer.—The best of us are bound to be rash sometimes, and there is nothing much harder than to watch others eat when you are hungry.

Now the door to the cow stable was opened, and the milking pails brought forth. The cat, at least, had gone,—though just where, Mammy had not seen.

"Isn't it mild this evening, Father?" asked the boy, as the farmer came down to pitch hay for the horses. "Wish you'd let me drive the cows outside, where it is lighter, while we milk them!"

"Go ahead," said the farmer, gazing off at the red glow of the sunset, which had piled rose and purple clouds above the snowy horizon.

And the next thing Mammy knew, the six red cows were trampling the snow in the pasture between her and her orchard.

Now she was surrounded!

Yes, sir, Mammy Cottontail had no sooner crept forward for that cabbage leaf than she found herself surrounded. On one side was the barn, on the second the circle of red cows, while on the third her escape was cut off at this moment by Barn-yard Tom, whom she spied creeping toward her along the top of the fence. In the only direction left, the Hound sprang up with a yip of delight as she made a wild dash to get past him. There seemed to be no way out!—And the cabbage not yet tasted for which she had risked the safety of her Old Apple Orchard!

If she had not been faint from hunger, she might have ventured a straight-away race with the Hound. But she was weak and famished, and besides, the snow had covered all her favorite hiding places. Things certainly looked bad for Mammy Cottontail!

Then,—swift as a streak of lightning,—mammy turned and darted between the legs of the six red cows!

Now the cows hated Lop Ear the Hount. Distrusting him at best, when he came baying at them full tilt after Mammy, they over-turned their milking pails and gathered in a circle, lowering their horns at him and mooing their displeasure.

"Here! Lop Ear!—Home with you!" commanded the farmer sternly. And the spotted hound, afraid to disobey, gave up the chase, and slunk crest-fallen back to the farm house porch, where he sulked with nose between his paws, even when the boy poured the foam from the milk pails into his pan.

Meantime Mammy made good her escape. And that night the boy followed her tracks to the orchard by the light of the moon, and left her a cabbage as big as herself. And for many nights thereafter he remembered his tiny neighbor, as he did Chickadee,—till spring had once more spread her feast of plenty for the furred and feathered folk.

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"HALL OF FAME" FOR TREES

George Washington tied his horse to a ring in this tree in front of the Timothy Ball House at Maplewood, New Jersey, according to the data sent the American Forestry Association by Frank J. Parsons, who nominates the walnut for a place in the Hall of Fame. This tree is said to have been planted at the time the Timothy Ball house was built in 1743. When visiting his cousins, the Balls, General Washington is said to have frequently hitched his horse to an iron ring which for many years was attached to the tree. Old residents now living recall this ring. The Rev. George W. Clark, a great-grand-son of Timothy Ball, in his book, "Struggles and Triumphs of a Long Life," refers to the old tree as follows: "When I was a boy, in 1849, the tree was then of tremendous size and the records of the times tell of a ring to which the horse was tied. This tree was used as a dividing line by the congregations of the Presbyterian Churches of Orange and Springfield, it being approximately three and a half miles from each church. Those on the South side were expected to attend the Springfield Church and those on the North side the Orange Church."





This white oak is nominated for a place in the Hall of Fame of the American Forestry Association because it is more than 250 years old and is a tree "without a heart." The tree is on the estate of Carl O. Hedstrom at Portland, Connecticut, and the trunk is hollow. This hollow trunk has been filled in and the tree is as good as ever, says N. A. Millane, who nominates it for a place in the Hall of Fame. In excavating the trunk of the tree a bottle was found in which was a man's name and address showing the tree's great age.

"HALL OF FAME" FOR TREES

Here is the Wethersfield Elm, for which the claim is made that it is the largest elm in the United States. The age of the tree is 250 years, the height 97 feet, it has a spread of 147 feet and a circumference of 28 feet. Some of the limbs extend sixty feet from the trunk and two of the limbs were destroyed in storms during 1918.



A great deal of care has been given this tree by the improvement association of this Connecticut town and a great deal more care must be given it, experts say, in order to save the tree. N. A. Millane, of Middletown, Connecticut, also nominates this tree for a place in the Hall of Fame of trees being compiled by the American Forestry Association.



Beneath these trees the most famous, twelve white oaks in the United States, General Washington often sat. They have been nominated for a place in the Hall of Fame of the American Forestry Association at Washington, which asks for data and pictures of trees with a history. The trees in this picture were planted in 1730 on the Baylor-Newmarket Plantation in Caroline County, Virginia. J. B. Baylor, who nominates them for "Who's Who," says that two famous men were born in a house once within the shade of these trees often visited by General Washington. One was Colonel George Baylor, aide to General Washington; and the other was Major George Armistead, who was in command at Fort McHenry when Key wrote the National anthem.

NEW FRIENDS BEING MADE FOR

WITH the coming of Spring the editors of the country are continuing their co-operation with the American Forestry Association's drive for the planting of memorial trees and "Roads of Remembrance." These two campaigns have awakened new interest in trees all over the country and, together with the "Hall of Fame" for trees with a history, the Association is being introduced in new places every day. The first shipment of tree seeds to Europe brought forth widespread comment on the good work of the Association and again directed attention to its campaign for a national forest policy. Taking up these subjects, we find editorial comment from coast to coast. Some of this follows:—

Seattle Times:

A campaign is being carried on throughout the United States by the American Forestry Association of Washington, D. C., urging motorists to help, by planting memorial trees along the highways, to beautify the roads for which hundreds of millions of dollars have been voted by the various national, State and local governing bodies. Motorists everywhere will gladly aid this excellent movement, and will undoubtedly join the Association so as to work in conformity with its plans.

Local communities and commercial interests will benefit, and motorists, who are the greatest users of roads, will derive pleasure and reward for generations to come, if they, individually and collectively, co-operate in the actual planting of trees in accordance with the general plan.

Cross-country touring from the Atlantic to the Pacific is becoming more popular every year, and it will be possible eventually to have trees growing the entire distance on both sides of the 3,000-mile highway, making it the most wonderful monument and "Road of Remembrance" in the world.

Morgantown, W. Va., Post:

The plan of the American Forestry Association to cast a halo of sentiment around good road construction is an excellent one, both for the promotion of road building and the creation of large popular interests in the purpose of that Association to preserve and restore our vanishing forests. We have heartily commended the idea of these memorial trees and the sentiment they would perpetuate, and we welcome this practical move on the part of the American Forestry Association. Tree bordered highways, with such sacred associations, would be something more than mere roads in the minds of the people, and the voting of bonds or taxes for making them good roads would be far more popular.

Providence Journal:

"Roads of Remembrance," advocated by the American Forestry Association, have material as well as sentimental value. Memorial trees at this time are as appropriate as memorial highways, and no State can afford to overlook the possibilities of well-shaded roads. This is a good time for tree planting, and existing road departments can do the work without calling upon the taxpayers for large appropriations. Trees are comparatively inexpensive, the land along the roads need not be bargained for, and forestry experts for supervising the preparation of the ground and the setting of oaks, pines, elms or maples are always available. For nearly 300 years Americans have been destroying their forests; it is time for the inauguration of a different policy, and memorial highways, while offering, of course, no large solution of the problem, would be a step in the right economic direction, in addition to their esthetic and sentimental value.

Wisconsin Motorist:

A very worthy compaign is being carried on throughout the United States by the American Forestry Association of Washington, D. C., urging motorists to help, by planting memorial trees along the highways, to beautify the roads for which hundreds of millions of dollars have been voted by the various national, State and local governing bodies.

Motorists everywhere will gladly aid this excellent movement, and will, undoubtedly, join the Association so as to work in conformity with its plans rather than go about planting inappropriate trees in undesirable places.

Meridian, Miss., Star:

When a given product bids fair to last thirty or forty years ahead it is rather difficult to awaken public interest to the necessity of seeing that the product, if it be worth while, lasts longer than that number of years, to see, in fact, the need for preventing exhaustion of that product.

Charles Lathrop Pack, president of the American Forestry Association, is endeavoring to awaken the public mind to the need of replacing the American forests. He has been at it for several years, but has, we presume, found it "an endless job," though he has never given up hope. He is distributing literature, through woman's clubs, churches, civic organizations and the newspapers, in his efforts to reach the public and to create an interest in forestry. Among his first steps was to endeavor to secure the co-operation of owners of timber land and forests in adopting a fire-protection policy.

He suggests, through clubs and civic bodies, that as new highways are built and old ones rebuilt, trees be planted along these highways, as memorials to men who gave their lives to their country—the doughboys, the marines, the sailors and others. This suggestion is meeting with a generous response. Trees are being planted as memorials, remembrances and monuments.

Paterson Evening News:

The American Forestry Association has issued an appeal to every school in the country to plant a tree. Tree-planted schoolhouse grounds will serve several ends. If every schoolhouse could be made a center of pretty landscape gardening, the idea would spread from the children to the homes. People would want the grounds around other public buildings improved. The unsightly railroad stations and other structures which now serve the public so shabbily would be given a setting of foliage.

Children who acquire this idea of beautification will keep it when they grow up. When they move to a newly laid out street they won't be content with treeless land and shrubless soil, but will want a nest of verdure around their homes. This will improve property, make real estate more valuable and give a town a reputation for improvement spirit. These children would be apt to become more interested in trees, learn how much value they add to waste land, and perhaps do some reforestation if they ever own land.

White Plains Reporter:

If the people of the United States want to establish a memorial for all time in honor of Theodore Roosevelt, let them link his name with a nation-wide movement to establish a national forest policy. This was the message to the Tristate Forestry Conference by Charles Lathrop Pack, president of the American Forestry Association of Washington. Mr. Pack urged everyone to join the American Forestry Association in its campaign for a national forest policy.

Hammond Times:

If there is one man in American history besides Washington and Lincoln who deserves a memorial that the entire nation should take pride in, that man is Theodore Roosevelt, because he would have been the last man to seek such an honor.

Nation-wide planting of memorial trees and the naming of a great national highway in honor of Theodore Roosevelt have been suggested by Charles Lathrop Pack, president of the American Forestry Association.

FORESTRY IN ALL PARTS OF THE WORLD

Boston Traveler:

On Boston Common representatives of the American Forestry Association presented to consular agents of Great Britain, France and Belgium, 35,000,000 tree seeds.

What finer testimony of American interest in the economic reconstruction of these Allied countries could be given? Millions of trees, replacing those cut down or demolished in the war, will in future years remind these peoples who sacrificed so much to save civilization, that the United States, less afflicted by war, gave freely of its resources, not only for war, but for the replacement of war losses.

The need of reforestation is apparent from the fact that Great Britain cut down more than half its standing timber during the four years of titanic conflict. In France and Belgium, although the percentage of trees destroyed was smaller, the damage in the battle zones was more complete.

A happy thought was that which found expression in this gift of tree seeds.

Washington Herald:

The American Forestry Association has shipped to Europe 35,000,000 tree seeds with which lands swept by war or estates stripped of their forests for use by the Allies in legitimate military operations may be reforested. Great Britain, France and Belgium will get most of these embryo oaks, maples, firs, larches and ashes; and a generation will look upon them in their glory, let us hope, that will not have to see them converted into trench and mine supports or decimated as they stand by the fire of guns.

This gift has been made possible by voluntary giving. It has not come out of the public treasury. It represents the goodwill of a very fine corps of professional men, some of whom learned the fundamentals of forestry in Europe or from Europe's literature on the subject and who thus feel that they are in a way paying a natural debt of gratitude.

It also represents the opening of purses by other people, who like to make their money investments, even those of goodwill, as enduring as possible. He who invests money in a tree wherever planted benefits society in a variety of enduring ways, not at all subject to the mutations of the stock market, or the reversals of personal or party fortunes, or the ignorance of men in high places in state and school. He sets up a league with nature, becomes an ally of sun and rain, and establishes working relations with the unmoral forces of life, which often are so much more likeable than the moral and immoral ones, because so impartial, enduring and great as contrasted with the pettiness of man in his efforts to do both right and wrong.

In this particular instance the tree-planters are in their own quiet way, while diplomats, statesmen, financiers and class-conscious groups wrangle over the reconstruction problem, doing an effective job in genuine A No. 1 internationalism. The more money the American Forestry Association gets for this work the more seeds will go to Europe.

Boston Evening Transcript:

A really wonderful gift is the present of forest tree seeds which the American Forestry Association makes to the representatives of Great Britain, France and Belgium on Boston Common. The lives of millions of human beings and of horses are not the only lives sacrificed in vast numbers in the great war. Millions of trees, and indeed whole splendid forests, have gone down in the conflict. Wooded areas in France and Belgium are incapable of spontaneous restoration, so complete is the destruction; the land must be prepared and re-seeded. In Britain, where the sacrifice of the woods has been only through cutting for war uses, and not by the wholesale destruction of actual warfare, spontaneous or locally provided seed restoration should be possible. But great quantities of forest tree seeds are needed from abroad for prompt restoration. About the only European forest or propagating grounds which could supply these seeds are those of Germany. And under all the circumstances it is probable that the Entente peoples would much rather look to America for forest tree restoration than to Germany.

The sentiment of the transaction is all right. Nothing can be more appropriate than that America should bear to ravaged France and Belgium the gift of trees. The American Forestry Association has done a noble thing in donating the seeds.

A GIFT TO EUROPE

A SHIP is now on its way to Europe bearing a gift to England, France and Belgium of a novel sort and fraught with many possibillities. We may assert that the voyage of this boat may teem with great consequences so that it may be comparable to the vessel which carried the first United States soldiers to the great war and it may prove to be of more importance than any of the trips of the steamship George Washington.

The boat carries 35,000 tree seeds, the gift of the American Forestry to aid in reforesting the three countries mentioned. The varieties of seeds include tideland spruce, white ash, rock maple, tulip, white fir, Douglas spruce, western larch, English spruce, red oak and scarlet oak. It will be seen that the conifers are in the majority and we are told that the seeds have ensured inspection and whatever else may be necessary to rid them of any form of fungi or disease and are further informed that other shipments will follow as fast as the seeds are collected.

There is need enough of these, for men who have been overseas have told us of the necessary or wanton destruction of trees in France and Flanders. Many will be surprised that there is need of reforesting in England, but the American Forestry Association says that during the war the English cut down more than half the trees on the British Islands in order to carry on war work, and thereby suffered a greater percentage of loss than either France or Belgium.

One may hope that the oaks will thrive, both the red and the scarlet, although we realize that the percentage of germination of acorns is low, as they will add to the beauty of the landscape no matter in what part of the world they grow. They may be deliberate in their growth but they, at least, can afford the time.

The tulip tree makes, we feel, more rapid growth than any of the other varieties in the list and yet, if these trees find the soil and climate friendly, they will be towering over French and Flanders fields long after the last veteran has gone hence and the war has become a matter of tradition to the people of France and England. Even then, if they grow, the oaks will be vigorous after the other trees have completed their growth and are serving the needs of the people. It is no small gift to Europe, these seeds that are now on their way across the ocean.—HARTFORD COURANT.

BLASTING TO AID CENTRAL PARK TREES

AN interesting experiment in the use of dynamite in aiding the growth of trees was recently made in Central Park, New York City. As explained in an article in AMERICAN FORESTRY Magazine (October, 1919), and as pointed out by Commissioner of Parks Francis D. Gallatin, the subsoil underlying the greater portion of



TREATMENT FOR DYING TREES

Francis D. Gallatin, New York's Commissioner of Parks, drilling a hole in the ground close to a dying tree. Nitro-glycerine was placed in the hole, and the ground around the tree shattered and broken in the endeavor to provide additional nourishment to the tree.

Central Park hinders the growth of trees of the deep rooted species because the roots cannot penetrate it, and it also makes an artificial water level, keeping the top soil flooded during the wet season and abnormally dry during the dry season.

The experiment in blasting the soil was intended to shatter this impervious subsoil, permit better drainage and add to the vitality of the trees. The experiment was on the west drive, between Ninety-fifth and Ninety-sixth Streets under the direction of Commissioner Gallatin and in charge of City Forester J. S. Kaplan. Ten holes were made with a soil auger, about nine feet apart and at a radius of about twelve feet from the body of a pin oak tree about 21 inches in diameter. The holes were from two and one-half to three and one-half feet deep, depending upon the depth of the hard pan clay subsoil. Each hole was loaded with Red Cross Extra dynamite by F. T. Ransom, an expert of the Du Pont Powder Company, and all were fired together. The hardpan all about the tree was well loosened. In two of the holes pin oak trees three inches in diameter were planted and their growth will be watched with interest, and compared with the growth of similar trees planted in unblasted holes.

Commissioner Gallatin says: "I have given this matter considerable study for several months ,and upon the advice of Prof. J. W. Toumey, of the Yale School of Forestry, who made a comprehensive survey of the tree



DYNAMITE FOR TREE PLANTING

A tree being planted in Central Park, New York city, in a hole made by dynamiting the ground. The heavy subsoil in Central Park makes it difficult for trees to thrive there, as their roots will not penetrate it. Breaking up the ground in this way gives them a better chance.

situation in Central Park with the Forester of this Department, we have decided to carry out this experiment through the kind co-operation of the Du Pont Powder Company."

If the experiment is successful it will mark the beginning of the mechanical rejuvenation of the soil in Central Park and will greatly improve and strengthen the trees.

THE following applied and were elected Life Members of the American Forestry Association in February:

Jane A. Tracy, Ohio.

Mrs. H. J. Lutcher, Texas.

Mrs. L. Carteret Fenno, Massachusetts.

Mr. E. P. Mellon, New York.

Mrs. Richard March Hoe, New York.

THE new envoy selected by President Wilson to serve as Ambassador to Italy is Robert Underwood Johnson. Mr. Johnson has long been associated with the American Forestry Association as a member, and he succeeds in his high office as American Ambassador to Italy the Hon. Thomas Nelson Page, who is also a member of the Association—a former Director and now a Vice President.

PINCHOT, PENNSYLVANIA'S NEW FORESTER

FOREST conservationists throughout the United States will view with favor the appointment of Gifford Pinchot as Commissioner of Forestry for Pennsylvania, as announced by Governor Sproul on March 10. Mr. Pinchot has been a member of the Pennsylvania Forestry Commission for a year. During that period he vigorously attacked the policy of Robert S. Conklin, who has been Commissioner of Forestry for the past sixteen years and whom Governor Sproul has now made a member of the board of water supply commissioners.

Mr. Pinchot accepts the position because of his deep interest in the work and his love of forestry and expects to institute various new measures in the management of the state forests. He says of his appointment:

"To stop forest fires and put back into the productive area of the state that 5,000,000 or 6,000,000 acres of unproductive land within our commonwealth, once among the richest forests of America, but now useless and barren, is in my judgment one of the biggest things that can be done for the State of Pennsylvania. I answered the call of the Governor to help him do it."

In commenting on Mr. Pinchot's appointment, Governor Sproul said: "I have commandeered Mr. Pinchot's services. We have in him a citizen, who is the foremost figure in forestry in the United States, and I thought we should have the benefit of his services at home. Mr. Pinchot has been used to handling national problems, but Pennsylvania is an empire in itself.

"Pennsylvania and the six states bordering it contain about 30 per cent of the entire population of the Union, and our state forests, which soon will be accessible by good roads, will be a benefit to all of those people. Our forestry work is one of the inspiring problems before us, and Mr. Pinchot's enthusiasm for that work and his devotion to it are recognized everywhere.

"There is no politics in his appointment. He and I sometimes do not agree in our politics and may not in the future, but we do agree in our desire to serve the state and in our belief that public good is the best political asset.

"There is no reflection on Mr. Conklin in the change. I have stated to him that no criticism that ever reached me of his department has reflected in any way on his official integrity or his personal honor."

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree.

LITTLE ROCK, ARK.

By Headington Chapter, U. S. D. 1812: Frank Adam Heisserer, Melchior M. Eberts, Fay P. Washington, Frank Dorsey Hussman, Lewis Paline, Clifton McDonald, Charles Sol Narkinsky, James Marion Lee, Jr., George S. Martin, James Boyd Jeffries, Jr., Curtis McElroy, C. G. McCoy, William Lee Linder, Allen B. Hearin, James P. Clarke, Leo Massar, John Randolph Wassell, Wesley Philip Boyce.

MILTON, FLA.

By Santa Rosa County Chapter of American Red Cross: Corporal David Frank Wilson, George Wiggins, Lt. Norman Ashton Garrett, Curtis McSwain Council, Robert Kimmons, Frank James Hopkins, Dewey Martin, Oscar Reuben McLean, Rollin Ellis, Ralph Redd, David J. Kelley, Albert Broxson, Charlie Simmons, Robert F. Edeker Leroy W. Beck, George Glover, Albert Anderson, Daniel Bradley, Walter Morton, Children of Santa Rosa County.

TAMPA, FLA.

By Civic Association: Cora Belle Davis.

ATLANTA, GA.

By Atlanta Women's Club: Tom Skeyhill. By Uncle Remus Association: Joel Chandler Harris. By Woman's Pioneer Society: Charles H. Hunter. By Joseph Habersham Chapter, D. A. R.: Mrs. William Lawson Peel. By New Era Study Club: Charles L. Smith. By History Class: Henry Woodfin Grady. By Modern Topics Club: Corra Harris. By the Reviewers: Frank L. Stanton. By Atlanta Music Study Club: Edward MacDowell. By Georgia Colonial Daughters: Dr. Lucian Lamar Knight. By Council of Jewish Women: Emma Lazarus. By Atlanta Chapter, D. A. R.; Mrs. Lollie Belle Wylie. By Shakespeare Club: William Shakespeare. By Atlanta Writers Club: Miss Mildred Rutherford, Jack London, John Masefield.

CRAWFORDSVILLE, GA.

By Woman's Club of Crawfordsville: Glenn Thomas Lavender.

HEPHZIBAH, GA.

By Woman's Club: L. L. Atkins, Capt. John F. Carswell, Lieut. James A. Carswell, Charles A. Carswell, Drew Christie, T. F. Christie, Capt. S. A. Clark, Sgt. Robert C. Coffield, Lieut. Thomas H. Frost, Lieut. Robert C. Frost, J. C. Henderson, Robert A. Harden, W. A. Harden, Paul A. Harden, J. F. Hartley, Thomas L. Kelley, Capt. Alex. T. Murphey, Jim C. Murphey, Sgt. George E. Murphey, Lieut. David G. Mann, Bowdre M. Norris, Hugh L. Rhodes, Guy C. Smith, Walter B. Trammell, G. A. Uhlm, J. C. Uhlm, M. I. Uhlm, W. B. Skinner, George W. Vance, Denver Winter, W. W. Winter, Fred E. Turner, Samuel S. McClelland, Roy W. Woodward, Sgt. Ellet C. Walker, John G. Weathersbee, L. G. Sumeran, Roberson Foreman, Adam Rearden, Jesse Jones, Willie Jones, Paul Templeton, Cheney Templeton.

QUITMAN, GA.

By Hannah Clarke Chapter, D. A. R.: Lieutenant Wilbur Oglesby:

WHITE HALL, ILL.

By White Hall Art League: Amos Walker.

MARQUETTE, MICH.

By Lake Superior and Ishpeming Railway Company: John H. Vidlund.

MANTEE, MISS.

By Mantee High School: Clarence Springer, Allie C. George, Guy George, Lynn George, John C. Caples, William Caples, Alfred Caples, Bernard Pate, Leo Hunter, Robert Scott Hunter, Leonard Scott, Ira Forrester, Elmer Womack, Jodie S. Davis, Braden Skelton, Claude Barton, Tommy Osbourne, Ben Johnson, John H. Moody, Ciannie O. George.

ST. CLAIRSVILLE, OHIO

By Tuesday Night Club: Alice M. Young, Adelene M. Tallman, Ruth A. Butcher, Lula F. Sidwell, Margaret Greig.

PENBROOK, PA.

By Penbrook School: William James Taylor, Charles Henry Waltz, Robert Raymond Farling, Arthur Stoak, Walter B. Hinkle.

PROGRESS, PA.

Progress School: George Dewey Umholtz, James B. Martin, Ralph B. Kramer, Robert Heinley Hoke, Oliver Zeiders.

MITCHELL, S. D.

Mitchell Park Board: John Curtis Berry, Leroy George Fox, Wm. H. Jordan, Peter V. Brethorst, Lloyd A. Bishop, Howard Barton, William H. Coacher, Emil H. Carlson, Raymond S. Calkins, Wilber T. Derr, John W. Kempton, Emil Laurson, David McConnel, P. H. McManamen, Father C. E. O'Flaherty, McKinley Pound, Emil Rosenquist, Lester L. Slagle, Arthur Earle Shale, R. Carroll Thompson, Carroll B. West, Harry A. Hanson, Harold W. Gage, Edward Schmidt, Oliver L. Scott, Clarence McCune, Ray L. McLean.

TEXARKANA, TEX.

By High School: J. C. Watts. By Forestry Committee: Our Soldiers, Bowie and Miller Counties.

SECOND SOUTHERN FORESTRY CONGRESS

THE Second Southern Forestry Congress, held at New Orleans, on January 28, 29 and 30, was a fitting successor to the first Southern Forestry Congress, convened at Asheville, North Carolina, in 1916. While the first congress was admittedly "Southern in name only," a glance at the registered attendance at the second congress shows at once that it was indeed a Southern congress. Out of some 114 odd registered delegates there were 54 from Louisiana, 7 from Alabama, 6 from Virginia and from one to four from each of the following states: North Carolina, Georgia, Florida, Mississippi, Texas, Tennessee, Kentucky and West Virginia, with a few from other sections of the country than the South. The full program is, of course, too long to present to the readers of AMERICAN FORESTRY, but it may be said that the chief topic for discussion was the National Forest Policy of Colonel Graves, and that the outstanding feature of the meeting was the large number of interests represented. In addition to a goodly number of lumbermen, and representatives of the lumbermen's associations and the lumber trade papers, there were present and active at the meeting representatives of the turpentine and naval stores industry, paper and pulp industry, the furniture manufacturers, and the wood-using industries in general. The Southern Pine Association, the North Carolina Pine Association, the National Council of Furniture Associations, the Turpentine and Rosin Association, the American Hardwood and Manufacturers' Association, and the Southern Cypress Association were all represented at the meeting. In addition the railroads had sent six or more delegates, and the National Research Council, one. The Federated Women's Clubs of Louisiana were out in force and their active participation was one of the most significant features of the meeting. Members of the United States Department of Agriculture, the forestry organizations of four states, the United States Forest Service, and professional foresters and forest conservationists made up the balance of the attendance.

Wednesday, January 29, was devoted chiefly to a review of the progress already made in forestry in the South, and to Colonel Graves' presentation of his program for a national forestry policy. Governor-elect John M. Parker, of Louisiana, made a short address endorsing the objects of the meeting. Colonel Graves' program was first discussed from the point of view of the lumbermen, during which discussion Secretary Rhodes, of the Southern Pine Association, announced that he felt very hopeful that at its annual meeting in March, the Association would endorse the movement for a National Forest Policy. At that time a special forestry committee, which had been in conference with Colonel Graves, would submit a report on the latter's very practical program. The wood-using industries, represented by the furniture manufacturers and the sash, door, and millwork manufacturers, were next called upon for comment on a national forest policy, which they promptly endorsed.

Seventy-five delegates attended the banquet Wednesday evening, at which they were the guests of the Louisiana lumbermen, through the Louisiana Forestry Association.

Further discussion of a national forest policy from the points of view of the naval stores industry and the pulp industry marked the next day's sessions, after the secretary's report had been read and endorsed. It was voted by the Congress to continue the effort to raise funds for the erection of a suitable monument to George Washington Vanderbilt, one of the pioneers in the forestry movement in the United States. Among the valuable papers at these sessions were those by the secretary of the Turpentine Association and the Supervisor of the Florida National Forest. Two very interesting and important papers presented were a discussion by McGarvey Cline, of the Consolidated Naval Stores Company, of Jacksonville, Florida, of the Southern Pulp Industry, and a presentation of the forestry projects of the National Research Council, by Dr. H. E. Howe, of the Council. Considerable discussion also took place of the possibilities of combining stock-growing and reforestation on the same land, Professor S. M. Tracy, of the United States Department of Agriculture, being the first speaker. Two lumbermen, Mr. Henry E. Hardtner, of Louisiana, and Mr. R. M. Hogue, of Mississippi, described the success which had attended their own efforts at a judicious combination of these two valuable uses of the soil.

On the final day the Louisiana Forestry Association met jointly with the congress. After preliminary remarks by Ex-Governor Jared Y. Sanders, of Louisiana, and the Hon. Fred J. Grace, who was introduced as having been the first state forester of Louisiana, the subject of land classification was taken up under the leadership of Mr. Austin Cary, of the Forest Service, followed by consideration of the place of state forestry associations in advancing the cause of forestry. A very interesting paper on the turpentine industry of France was presented by Colonel T. S. Woolsey, Jr., of the Twentieth Engineers. The secretaries of the Southern Pine Association and the American Hardwood Manufacturers' Association reviewed the economic situation in their industries, and demonstrated the interest which is being taken by the lumbermen's associations in the question of forest conservation. The concluding subject was fire protection, with particular emphasis on the part played by the private owner and the railroads. State Forester R. C. Jones, of Virginia, was the chief speaker.

Before adjournment the congress passed a number of significant resolutions, the most important of which was that endorsing a national forest policy. Because of its importance this resolution is given in full as follows:

WHEREAS, The supplies of softwood and hardwood

timber in the Southern States are rapidly diminishing, with a consequent influence upon the price of lumber and other forest products, and

WHEREAS, The customary practice in lumbering and turpentining results in the denudation of the forest and the leaving of large acres unproductive and idle for indefinite periods; therefore, be it

Resolved, by the Southern Forestry Congress, That it deplores the continuance of such practice of denudation, and urges, in order that such practice may be avoided, the enactment of legislation by the Southern States that will prevent such denudation and will afford an opportunity for a natural replacement of forest growth on lands not suited or not now needed for agriculture or settlement; and, furthermore, the Southern Forestry Congress urges the States and the Federal Government jointly to co-operate liberally with owners in this direction.

Other topics covered in the resolutions were the leaving of seed trees by the lumbermen, rational forest taxation, establishment of state forestry departments, acquisition of state forests, extension of purchase by the national government under the Weeks Law, increased Federal appropriations for fire protection under the same law, forest experiment stations, and endorsement of the forestry projects of the National Research Council.

In order to insure the continuance of the agitation for forest conservation in the South during the ensuing year, the appointment of five committees was approved by the meeting. In addition to the executive committee, these were the committees on finance, on forest policy, on legislation, and on publicity. The committees are expected to be decisive factors in the forestry fight in the South; their personnel will be announced later.

Election of officers resulted in the unanimous choice for the presidency of Mr. Henry E. Hardtner, President of the Louisiana Forestry Association, and of the Urania Lumber Company, of Urania, Louisiana. One of the earliest and most practical advocates of forestry in the South, and the father of most of the Louisiana forestry laws, Mr. Hardtner has proved the sincerity of his professions by expending considerable money and a great deal of time and thought on the reforestation of his company's lands in central Louisiana. Urania Forest, established with the co-operation of the Louisiana Department of Conservation, under Commissioner M. L. Alexander, has achieved national fame. State Forester J. S. Holmes, of North Carolina, whose patient and able handling of the arrangements for the congress was the largest factor in its success, was re-elected secretary. Much extra work had devolved upon Secretary Holmes as a result of the illness of Colonel Joseph Hyde Pratt, President of the Congress, who had not recovered sufficiently to attend the meeting.

Every delegate to the congress testified to the value of the papers presented and the discussions which took place. The unusual amount of publicity given to the meeting by the newspapers of New Orleans, particularly the *Times-Picayune,* and the enthusiasm and interest aroused is certain to bear splendid fruit in the near future. If the interest displayed in this meeting is any criterion, the Southeast, the last region of the United States to espouse forestry, bids fair ultimately to become one of the chief sources of the second-growth timber of the Nation. Undisputed leader today in the production of lumber and naval stores from virgin timber, in a few years the South is destined to take a like place in the support of forest industries based on second-growth.

THE FORESTRY SITUATION IN MASSACHUSETTS

DECEMBER, 1919, marked the retirement from office of the man who had served as State Forester of Massachusetts for some thirteen years and the appointment by Governor Coolidge of William A. L. Bazeley as the first incumbent of the newly created position of Commissioner of the Department of Conservation and State Forester. Notable progress was made, considering the humble beginning in 1906, during the regime of the former State Forester; and yet to those appreciative of the State's wealth, the intelligence of her people, the extent and potential value of her forest lands the development appears less than it should have been, due largely to the fact that the State Forester and the Massachusetts Forestry Association, during the last few years, failed to work in harmony. It was a most unusual situation, as logically a state forestry association is the strongest backer of the state forestry department, and it led inevitably to waste of energy and lessened accomplishment.

Mr. Bazeley, previous to his appointment a member of the Massachusetts Forestry Association, should be able to maintain the closest co-operation between the Association and the State Department. Massachusetts with her dense population, high industrial development, excellent transportation facilities and large percentage of lands best suited for tree crops affords an unusually good field for profitable forestry, both on privately and publicly owned lands.

The American Forestry Association congratulates the new Commissioner upon the exceptional opportunity, which is within his grasp, for constructive service and large achievement.

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Marketing timber profitably.
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Improving the woods by the right kind of cutting.
Protecting the woods from fire and other injuries.
Utilizing farm timber to the best advantage.
Reclaiming gullies and utilizing waste lands by planting forest trees.
Keeping woodlands growing at their maximum rate of production.

Farm forestry, as a branch of agriculture, is the handling of forest trees and woodlands in such a manner as to increase the income and permanent value of the farm and add to its comforts and attractiveness as a home.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

SIR LOMER GOUIN, Premier of the Province of Quebec, at the annual banquet of the Canadian Pulp and Paper Association, made a very able address in which he discussed the relations between the licensees of Crown timber lands and the Government. He showed an accurate knowledge of the industry and of the necessity for putting the forests of the Province on a basis of sustained yield. Under his government the Province has made remarkable strides in forestry and he told of his sympathy with the movement and his determination to aid it in every way possible. He suggested that the holders of timber lands should spend more money on forestry work and in taking care of their limits, and assured them that the Government would help in every possible way. He stated that the Government was ready to provide instruction in technical subjects connected with the industry just as it had in forestry and commerce and made a strong plea for the employment of the young men of the Province in the pulp and paper industry. The far sighted and statesmanlike policy of the Premier in regard to the forests is much to be commended and as long as he holds his position Quebec is assured of a sane and progressive forestry policy.

The pulp and paper mills have always tried to use local men for their work but the instruction in many of the technical schools is carried on more from the European point of view, and has not been up to the standard maintained by the best modern institutions. Progress is however being made and the schools are rapidly improving.

The conference on forest protection held under the auspices of the Quebec Forest Protective Association was very successful. Mr. Piche, Chief Forester of Quebec, read an excellent paper. The principal discussion was on railway fire protection. For years the fires set by the Canadian Government Railways have been numerous and unnecessary and in marked contrast to the number set by privately owned lines. The situation has become almost intolerable and the owners of timberlands have about reached the limit of their patience. It behooves the men in charge of the Government lines to adopt a modern policy of fire protection. The attitude of the local officials has been entirely different from their superiors and their co-operation with fire protective agencies has been all that has prevented disastrous fires.

The St. Maurice Forest Protective Association has continued its progressive policy and has voted an extra half cent per acre for protection during the coming season and has voted $20,000 as a special fund to clear of debris a strip of land one hundred feet wide on each side of the right-of-way of the railway passing through territory under its jurisdiction. Close accounts of cost will be kept and the work for this season will be in the nature of an experiment. This ought to be a great help in preventing railway fires and is a long step in advance in fire protection. The work will probably begin as soon as the spring danger season is over, by piling the debris ready for burning during rainy weather or with the first snow next fall.

Mr. Piche made a most important announcement on behalf of the Department of Lands and Forests of Quebec, i. e., that any holder of Government timber lands who wishes to begin reforestation on any part of his holdings, would on presentation and approval of his plan by the Chief Forester, be furnished the necessary planting stock free by the Government. This he would plant under the direction of the Government Forester, the total expenditure to be deducted from the stumpage dues payable to the Government for the current year. This means that the limit holder will furnish the cash for the work but the Government would really pay for it. This is a long step in advance and it is hoped will be the beginning of extensive reforestation.

The Woodlands Section of the Pulp and Paper Association at its annual meeting made the following report and recommendations. That the Executive Committee of the Limit Holders Association of the Province of Quebec should be constituted an advisory committee to confer with the Minister of Lands and Forests on all matters relating to lands held under license. That experiments be made in clean cutting at the option of the limit holder in conjunction with the Government Forest Service, the sample plots upon which such experiments are carried out to remain a distinct forest reserve for a sufficient length of time to permit of the results being studied. In order to increase the output from the woods, all operators are urged to utilize and remove all diseased, lodged, blowndown and burnt trees and all tops in their cutting areas if they are of commercial value. That the personnel of the Forestry Service be increased and larger cash appropriations be made for its maintenance and activities. That operators be advised that there are forestry engineers, graduates of the Quebec Forestry School, who might be available where their services are required. Resolutions were also adopted as follows: that it is in the interest of Canada as a whole and of the wood working industries in particular that the fullest information be made available as to the character and extent of the forest resources of the Dominion and as to the conditions which govern the growth and reproduction of the commercially valuable tree species. That the work of the Dominion Conservation Commission along these lines, already under way, be indorsed, with particular reference to the survey of the forest resources of the several Provinces, in co-operation with the several Provincial Governments, and the investigation of conditions of growth and reproduction of pulpwood species in co-operation with the pulp and paper companies, the Dominion Forestry Branch and the Provincial Forestry Services, and that proper financial provision for the continuation of these studies on an adequate scale be made recommended to the Dominion Government. The deep appreciation of the section of the commercial utility of the work of the Dominion Entomological Branch of the Department of Agriculture, particularly the section presided over by Dr. Swaine and devoted to the study and extermination of forest insect pests, was expressed and it was recommended that the responsible minister provide sufficient funds in the estimates for the current year to at least double the number of parties in the field. It was finally resolved that in view of the large number of fires set by coal burning locomotives, and the losses caused by such fires, that the railways passing through forest lands should be operated electrically wherever there are water powers available.

The death occured suddenly on Wednesday, the fourth of February, of Mr. W. C. J. Hall, for many years in charge of fire protection in the Department of Lands and Forests in Quebec and also in charge of the Laurentide National Park. Mr. Hall was one of the charter members of the Canadian Society of Forest Engineers and did yeoman service for the progress of forestry especially along the lines of better fire protection. He was also much in-

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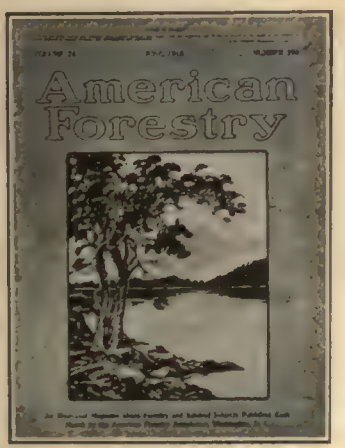


Norway Spruce, 18 Feet High.

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terested and very active in the protection of game and all kinds of wild life and the movement has lost a strong friend. All who knew Mr. Hall admired and loved him and his loss will be deeply felt.

The annual meeting of the Canadian Forestry Association was held in the Chateau, Frontenac, Quebec, on the third of February, and Mr. Ussher, of the Canadian Pacific Railway, was elected president.

Major-General J. B. White, of the Canadian Forestry Corps, was elected chairman of the Woodlands Section of the Canadian Pulp and Paper Association.

Mr. F. I. Ritchie, of the Wayagamac Pulp and Paper Company, was elected chairman of the Quebec Forest Protective Association.

Major Daniel Owen, President of the North American Securities Company, Ltd., who instituted and directed an airplane survey of timber lands in Labrador, says that for a rapid survey of forest lands the airplane photographs are very valuable. His method was as follows: to select a lot of two to three hundred acres and make a ground cruise, then to photograph this from the air. Photographs of other areas would then be made and compared with the ones of the ground-cruised area. The correctness of the method was proved by photographing unchecked areas and estimating them from the photographs and then checking on the ground. In every instance in which this was done, the air estimate was within ten to fifteen per cent of the ground estimate and was just as likely to be under as over in amount. The greatest difficulty encountered was in getting the approximate height of the trees. The majority of the photographs were taken at 1000 feet and whenever possible a cruiser was sent up as observer. About fourteen thousand photographs were taken covering the entire property. The property had been cruised for three years on the ground but Major Owen says that far more information of value was obtained in three weeks of flying than in the whole three years of ground work. His conclusion from his experience is, that an airplane photographic survey will show with absolute certainty the minimum amount of timber.

The Laurentide Company has had a party in the woods checking up aerial photographs, and so far the work proves Major Owen's contentions. This work will continue in the endeavor to work out a legend for reading aerial timber photographs. During the coming season this company expects to photograph several thousand square miles of its timber holdings. It has also adopted a definite reforestation policy and will plant up four to five hundred square miles in spruce at the rate of two square miles per annum for the next two years, increasing to four or five square miles per annum.

Captain L. M. Ellis, a graduate of the University of Toronto Forestry School, who worked with the Laurentide Company and the C. P. R. Forestry Service, and during the war with the Canadian Forestry Corps, has been appointed Chief Forester of New Zealand.

Captain H. R. Christie, returning from military service in Siberia, has been appointed Assistant Provincial Forester of British Columbia.

The British Columbia Forestry Service has reorganized and the salaries have been increased. This will set the pace for all other forestry organizations in Canada and will tend strongly to attract and hold able men.

Captain John Lafon, a Biltmore man, formerly with the British Columbia Forestry Branch, has accepted a very remunerative position in charge of logging for the Indian Forest Service.

R. D. Craig, assisted by Major G. H. Edgecombe and Lieutenant V. A. Gilbert, is engaged in a survey of the forest resources of Ontario for the Commission of Conservation.

H. R. MacMillan, ex-Provincial Forester of British Columbia, ex-Trade-Commissioner for the Department of Trade and Commerce, has formed the H. R. MacMillan Timber Export Company with headquarters at Vancouver. W. J. VanDusen, has resigned from the British Columbia Forest Branch to join this new firm.

The forest survey of New Brunswick, under G. H. Prince, is progressing well. Thirty per cent of the area of the Crown timber lands have been covered to date. He has also consolidated scaling, fire protection, fish and game protection and forest administration under one organization. The elimination of patronage has also been brought about by the introduction of civil service methods through an advisory board.

GOVERNMENT TIMBER FOR LOCAL USE

A TOTAL of 30,000,000 feet of Government stumpage directly adjacent to Loyalton and Sierraville, Sierra county, has just been withdrawn from the general market and will be held for purely local demand, according to a bulletin from the Forest Service.

"The timber situation in the vicinity of Loyalton and Sierraville is rapidly becoming acute," said Assistant District Forester T. D. Woodbury, in commenting on the action of the Forest Service. "Comparatively large mills are now and have for some time been cutting in this vicinity, but practically all the lumber so cut goes to the general market only.

"A large part of the timber in this locality is in private ownership and it is probable that most, if not all, of this private stumpage will continue to be shipped out of the country. In order, therefore, that the future needs of these two towns and the adjacent Sierra Valley may be assured, we have decided to withhold this amount of Government stumpage from general sale and reserve it for local needs only.

"In addition, the Forest Service will henceforth refuse to allow logable, sound, saw timber in this locality to be used for firewood, even for local consumption. This will work no hardship, since there is plenty of limb wood, which is good fuel, easily available, which, by arranging with operating companies, can be obtained free by local residents. Under such circumstances it would be economically unsound to allow saw timber to be used for firewood."

TREE HISTORY PRESERVED

PLANS to preserve the history of every species of tree known throughout the world have been announced by Professor Charles S. Sargent, head of the Arnold Arboretum, of Harvard University, which has established the most complete collection of trees and shrubs in America, the finest library in its special field and a herbarium of 200,000 specimens.

Profesor Sargent, whso has accompanied explorations throughout North America and the Far East, declares that if the alumni provide the funds necessary to carry on the work, the arboretum will purchase more land, make new explorations and bring into the parks of America many more new trees and rare shrubs. The arboretum was founded in 1874, and is considered among specialists to be the most important institution of its kind in the world.

RECEIPTS FROM NATIONAL FORESTS

RECEIPTS from the National Forests in the fiscal year 1919 were greater by $783,484.79 than in the previous year. This is the largest increase ever made in a single year. The receipts totaled $4,358,414.86.

To this total the grazing business contributed $2,609,169.85, the timber business $1,540,099.96, special uses (i. e., the occupancy of lands for miscellaneous purposes), $136,822.99, and use for water power development, $72,322.06. The receipts from grazing exceeded those of 1918 by $883,347.91, while the receipts from timber declined $93,549.46. Special uses showed a gain of $15,615.05, and water power a falling off of $21,654.29.

DURABILITY OF GREEN TIMBER

THAT there is practically no difference in the relative durability of green timber and seasoned timber when untreated and exposed to the weather and in contact with the ground, has been established by recent experiments conducted by the Forest Products Laboratory in connection with the manufacture of poles, posts or ties.

STATE NEWS

CALIFORNIA

AT the eighth annual meeting of the California Forest Protective Association Secretary and Treasurer George H. Rhodes in his report for 1919, reviewed the forestry legislation enacted by the California Legislature of 1919, and directed particular attention to that which provides for a State Board of Forestry, consisting of "Four persons, one of whom shall be familiar with the timber industry, one with the live-stock industry, one with the grain and hay industry and one at large, who together with the State Forester, shall constitute the State Board of Forestry, which shall supervise and direct all matters of state forest policy, management and protection."

All the members of this board are appointed by the governor and serve at his pleasure. This board, having supervision and direction of all matters of state forest policy, management and protection will not only be an effective means of taking care of forest problems in California, but will also be in a position to co-operate in working out National Forest Policies and Legislation.

In the matter of forest fires, the report of the United States Forest Service covering the National Forests in California for 1919 showed that there were 1108 fires within the boundaries of the National Forests of which 19 caused a damage of more than $1000, 55 caused damage of from $100 to $1000 and 254 caused a damage under $100, leaving 780 which burned less than 10 acres and did no damage. There were 59,755 acres of timberlands burned over and 191,543 acres of open land. The amount of timber burned was 55,999 thousand feet, with a value of $133,025; the average amount of timber burned per acre was 982 feet, with an average value of $2.24 per acre.

Reports from private owners of timberlands outside and inside National Forests showed 19 thousand acres burned over, with a total damage of $40,000—$19,000 the cost of fighting fires, $45,000 the cost of protection against forest fires and 3,000 men available for fighting forest fires in emergencies.

There are 27 timbered counties in California and in 17 of these no timberlands were burned over during 1919, and this was the worst forest fire season since 1910.

There are approximately 15 million acres of timberlands outside and inside the National Forests in California and the reports of the United States Forest Service and the State Forester show that 75 thousand acres were burned over, with an average loss of approximately $2 an acre.

The secretary directed attention to the announcement of the State Board of Forestry that it has adopted four clauses for legislation to be considered and presented to the Legislature of California in 1920. These four clauses are:

1. Appropriation by the State Legislature of sufficient funds for the prevention and suppression of forest, grain and pasture fires outside of National Forests.
2. Acquirements of logged-off areas, both in the redwoods and pine forests, as a nucleus of state forests for future timber supply.
3. Acquirement of watersheds necessary for the conservation of water for domestic and irrigation purposes.
4. Renewal of forests on logged-off areas and watersheds that are in need of reforestation.

Board members pointed out that the forests of the United States are melting away at the rate of 40 billion feet board measure per annum in excess of what is grown, and that the next decade will see

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AFTER BARK BORERS

REALIZING that the destruction of California pine timber by bark-boring beetles is a serious menace—a menace directly comparable only to that of forest fires—District Forester P. G. Redington, of San Francisco, has arranged for control work looking to the eradication of these destructive insects in some 115,000 acres of Government timber on the San Joaquin River drainage in the Sierra National Forest.

unprecedented logging and milling operations in progress on this coast because the forests of the Atlantic and Gulf States are practically gone. Practically no attempts are being made anywhere to provide for new forests on logged-off areas.

"Immediate action must be taken in California," declared Dr. George C. Pardee, Chairman of the Board of Forestry, "if this state is to profit by the mistakes of states and other nations that allowed their forests to be devastated without providing for future forests.

NEW JERSEY

THE FOREST FIRE SERVICE, which has been developed into an effective force with over 360 fire wardens, has been operating in the field on a pay-scale based on prevailing rates for common labor of 14 years ago. With changing conditions the morale of the organization is being maintained with more and more difficulty because there is less desire for appointment as fire wardens. This is true not only because they feel that their services are inadequately rewarded but because they find it increasingly difficult to secure the prompt and willing assistance that is so imperative in curtailing fire losses.

At the request of a large number of townships and after a thorough study of the situation by the State Fire Warden a bill has been introduced in the Legislature which provides an increase in pay of fire wardens while engaged in fighting fires to $2 for two hours or less and 50 cents per hour thereafter. The present rate is $2 for five hours or less and 30 cents per hour thereafter. The pay of fire wardens for other work would be increased from 25 cents to 50 cents per hour. The annual salary of $20 for township wardens and $10 for district wardens would remain unchanged. The pay of helpers fighting fire, which is $1 for five hours or less and 20 cents per hour for more than five hours, would be increased to $1 for two hours or less and 40 cents per hour for more than two hours. Helpers on patrol or employed otherwise than fighting fire would be increased from 20 cents to 40 cents per hour. Townships pay one-half of the cost of fire fighting and any township may fix its own rate, according to the bill, but in no case would the State's share be based upon a higher rate for services than that provided above.

A reorganization of the field force of the Forest Fire Service has been practically completed. The three-year terms of most of the local fire wardens expired this year, giving an opportunity to make desirable changes. The dead wood has been replaced by good timber and special efforts have been made to insure that wardens who have displayed ability be reappointed.

IN addition to the new forest fire lookout towers recently begun, New Jersey has just been assured that a fourth will be ready when the spring opens. Through the generosity of the New Jersey Zinc Com-

pany, this tower will be erected at Edison on the site of the "great inventor's" big iron mining property developed years ago and since abandoned. The tower will be the most accessible of those in the mountain country of North Jersey, being immediately adjacent to a well traveled public road. Despite this it will command one of the most beautiful and extensive vistas of the North Jersey area, making it unusually attractive for the pleasure-seeker as well as valuable for its primary protective purpose.

A careful estimation of the two million acres of woodland within the State places their present value at not over $6,000,000. State Forester Alfred Gaskill asserts that by checking abuse through fire, waste and neglect, and by putting the woodlands under practical forestry management, they can be developed into property conservatively valued at $200,000,000. While the people of the State are now importing twenty times as much timber as our forests produce, a large portion of future demands could then be supplied with local timber. To bring about these better conditions is the aim of the Department of Conservation and Development. To this end the State Forester is making a survey of present progress. Blank information sheets have been sent out to all persons who have indicated an active interest in the past. Anyone in New Jersey who has been engaged in the practice of forestry in any way can help greatly by informing the State Forester at Trenton of work done and results obtained, and by giving suggestions. The amount of active cooperation from forest owners determines to a large degree whether 45 per cent of the State's area shall be "despised waste land" or a highly productive woodland to be enjoyed by all.

WISCONSIN

THAT the work of the conservation commission in encouraging planting of forest trees on farm woodlots, estates and idle and waste land in Wisconsin is progressing favorably, is evidenced by the fact that during the last five years approximately 800,000 trees have been planted by citizens of this state. This work takes on an added significance this year.

The campaign to make Wisconsin increasingly beautiful, initiated by passage of the rural planning law in 1919 and the subsequent organization of rural planning committees in the counties draws attention to the fact that tree planting and tree conservation along highways, lake frontages and water courses is of first importance.

PLANTED FORESTS

THERE is a great advantage in planted forests over natural forests," says James S. Whipple, former State Forester of New York State, in a recent bulletin. "Density of forest growth is all important. That can be obtained in uniformity only by planting. Unless the growth is dense, close together, the trees will not do well. A tree standing alone grows to limb, is short and produces little or no lumber of value. If close together, trees grow tall, have few limbs and one tree will make several saw logs and produce much clear stuff lumber.

"A natural forest in the Adirondacks," he continues, "may produce if good, eight thousand board feet of lumber to the acre, sometimes more, sometimes less. A planted forest of pine, when mature, will produce from 50 to 80 thousand board feet of lumber on an acre. Therefore, we must plant forests."

MORE GRAZING IN NATIONAL FORESTS

THE demand for range on the National Forests was greater the past year than ever before in the history of the Forest Service, which branch of the United States Department of Agriculture has control of these tracts. Especially in the drought-stricken regions, stockmen, using the unreserved public domain or private pastures, eagerly sought forest permits in order to save their stock. The value of the system of range regulation in use has been so thoroughly demonstrated that representative stockmen from all the western States have declared emphatically in favor of placing the remaining unreserved public lands under Federal control and having them managed under a plan similar to that in effect on the National Forests.





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THE species of timber which form the bulk of our export trade, except Douglas fir, are those of which the supplies are most depleted. Thus, southern yellow pine forms half of our entire export trade, and the available supply is only 222 billion feet. At the present annual cut of saw-log size timber of nearly 17 billion board feet there remains only about 14 years' cut of the original supplies.

That these figures are not a mere theoretical calculation is proved by an official statement recently issued by the Southern Pine Association regarding the life of the southern pine industry. The Southern Pine Association estimates that 81.6 per cent of the mills will cut out their supplies in 5 years, 95.3 per cent in 10 years, and 99 per cent in 15 years.

JOHN C. OLMSTEAD DEAD

JOHN CHARLES OLMSTEAD, noted landscape architect and for many years a member of the American Forestry Association, died at his home at Brookline, Massachusetts, on February 24th. Mr. Olmstead was long associated with his stepfather, the late Frederick Law Olmstead, in business and his work included the architectural planning of grounds for universities, colleges, schools, capitol buildings, public libraries, public parks and extensive private estates. His career in his profession is marked by work in Boston, Cambridge and vicinity, New York, Buffalo, Rochester, Chicago, Milwaukee, Seattle, Spokane, Louisville; Hartford, Conn.; Fall River, New Orleans and elsewhere in the South. Mr. Olmstead was a member of many civic and scientific organizations, having formerly been president of the American Society of Landscape Architects, and his loss will be keenly felt by his confreres.

VOLUNTEER FOREST FIRE REPORTERS

A NEW call has been issued for volunteers—not for military duty, but for the important task of reporting forest fires in the Southern States. The Forest Service of the United States Department of Agriculture compiles reports regarding forest fires throughout the country which are invaluable to the conservation movement, and is in need of additional co-operators in the South, in order that it may have complete information regarding the frequency of fires in this region and the extent of their damage. In the North and West similar data are obtainable from State forestry officials, but in the South it is necessary to rely upon volunteer reporters. Already several hundred persons are co-operating with the Forest Service in this, but it is desired so to enlarge the force that much more complete information may be secured. Consequently the service desires to get in touch with any person in the Southern States who will be willing to assist in supplying this information. The duties of a co-operator do not require much time, the work consisting in making out an annual report as to the number of fires, their causes, the extent of the damage, character of the damage, and so on.

The seriousness of the forest fire menace in the South is shown by the following figures: In each of the past three years nearly 12,000 forest fires destroyed property in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi, valued at nearly $5,000,000; the total for the three years was 35,700 fires

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and a loss of more than $14,641,000. In the States of Missouri, Arkansas, Oklahoma, Louisiana, and Texas nearly 5,000 fires have annually destroyed $2,000,000 worth of property; the total for the three years is 13,983 fires, entailing a loss of $5,563,000. Thus in these two groups of Southern States, fires and fire losses for the past three years have reached the stupendous totals of 50,000 fires and $20,000,000 loss. With the exception of North Carolina, Louisiana, and Texas, no organized effort is made to control such fires, and even in these States the effort is far from adequate. The proposed enrollment of a large additional number of co-operators will, it is hoped, be a step in the direction of more widespread conservation.

CURRANTS AND GOOSEBERRIES SPREAD WHITE-PINE DISEASE

DESTRUCTION of all currant and gooseberry bushes within 900 feet of valuable native and planted white-pine trees is the urgent recommendation of Federal and State authorities to pine owners in regions where the destructive white-pine blister rust has appeared or is likely to appear.

This action is urged as a result of reports made when representatives of the northeastern and middle western white-pine States, the Canadian Government, and the United States Department of Agriculture met recently in the Fifth International White Pine Blister Rust Conference. It has been proved that blister rust spores may spread for many miles from white pines to currant and gooseberry bushes, and over relatively short distances from the currants and gooseberries to other white pines. Under most conditions, it is believed, a safety zone 600 to 900 feet wide around the white pines to be protected will interrupt the "vicious circle" of the disease and will allow the commercial growth of white pine. Other conditions, however, may require wider safety zones, and pine owners in the various regions are advised to ask their State forester or the United States Department of Agriculture for expert advice upon this point.

TREE PLANTING IN NEBRASKA

IN the State of Nebraska alone, where Arbor Day originated, 300,000,000 trees have been planted since 1872, when Hon. J. Sterling Morton, afterward Secretary of Agriculture, began his tree planting. In China the Ginling College Arbor Day ceremony is celebrated the first of April. Each class plants a grove of trees, one tree for each member of the class. Each girl uses the spade for her namesake tree. Secondary school teachers hope to establish the same custom on school property all over Central China.

"The Dessert Berry of the Nation"

The Erskine Park Everbearing Red Raspberry

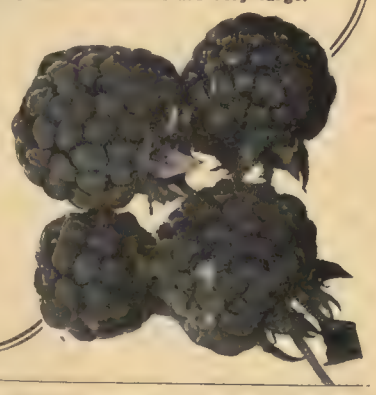
"THE WORLD'S GREATEST EVERBEARING RASPBERRY"

was discovered on the Westinghouse Estate (Erskine Park) at Lee, Mass., by Mr. Edward Norman. This magnificent estate is in the midst of the beautiful Berkshire Hills, with a temperature in winter of 30 or 40 degrees below zero, so that the hardiness of this berry is unquestioned. The estate is surrounded by the summer homes of many wealthy people, and much to the surprise of his neighbor gardeners and not without a deal of personal satisfaction, Mr. Norman furnished large, luscious raspberries throughout the fall for various dinner parties.

These berries are commented on by all who have seen and tasted them as the most delicious and best raspberry they have ever eaten. Mr. Baker of Hoosick Falls, N. Y., writes us as follows:

"In the season of 1916, Mr. George M. Darrow of the United States Department of Agriculture was traveling from the Atlantic to the Pacific, visiting fruit growers to obtain information on berries for bulletins published by the Department of Agriculture. Mr. Darrow had visited this estate before, and was most favorably impressed that this berry was far ahead of the St. Regis and Ranere, and when it became known it would replace these varieties. The plant is by far the strongest growing raspberry I have ever seen. It branches like a tree, and it also has the largest and most roots of any variety with which I am acquainted. It is perfectly hardy and the berries are very large.

Conceive the joy and satisfaction of having such berries on your table all through the autumn, the source of wonder to your neighbors, that you can pick the finest raspberries until the snow flies. On November the 20th we cut a large branch of the Erskine Park with blossoms, green berries and ripe fruit upon it.



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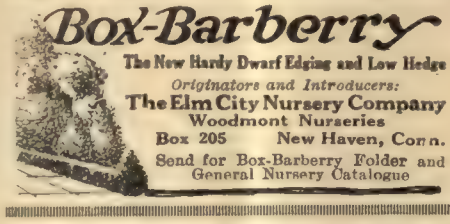
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FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.35
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	2.50
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	1.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.35
LUMBER AND ITS USES—R. S. Kellogg	2.15
THE CARE OF TREES IN LAWN, STREET AND PARK—B. E. Fernow	2.17
NORTH AMERICAN TREES—N. L. Britton	7.30
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*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

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I need a copy of **Forestry and Irrigation** for March, 1904. Will anyone who can furnish a copy please write me promptly? I should also like to hear from anyone who can supply copies of **The Forester,** bound or unbound, before December, 1900. I have quite a number of duplicates of **Forestry and Irrigation, Conservation** and **American Forestry,** the oldest being December, 1902, and should like to get in touch with anyone wishing to complete their files.

GORDON PARKER, Colorado Springs, Colo.

DEAN BAKER'S NEW WORK

THE American paper industry has taken over Dean Hugh P. Baker, head of America's biggest forest college—the New York State College of Forestry at Syracuse, under conditions which indicate both that America's timber industry appreciates the need for a study of future raw materials, and for men with a technical knowledge of forestry in industry, and also that American education does not offer sufficient financial inducement to hold as college officers men who are wanted in business.

Dr. Baker resigned January 10 to accept twice the salary which he is now rated as receiving, to become secretary-treasurer of the American Paper and Pulp Association, with headquarters at New York. He was to take up his new work about March 1. The trustees will select a successor to Dr. Baker at the July meeting, unless a special meeting is held earlier.

The selection of Dean Baker for the executive officer of the parent association of America's great paper industry, means, according to Dr. Baker, a greater opportunity for the advancement of the principles of the forestry profession than is possible in any college. His letter of resignation outlines important phases of American forestry development of the past eight years, and also discloses that in the spring of 1919 he refused an offer of $7,500 from the outside, to remain as Dean of the College at a $6,000 salary. Even this sum he was not to receive at once, for under the rigid New York State budget the raise would not become operative until July 1, 1920, and then only after action by the legislature.

FORESTERS' WEEK

FORESTERS' WEEK, an innovation in New York forestry work and in the educational field, will be held at the New York State College of Forestry at Syracuse for the week beginning Monday, April 12. Special days will be devoted to particular features of the forestry problem. The Southern Pine Association, for instance, has already arranged to have its salesmen for this part of the country here for one day of special study of forestry problems to aid them in their work in the lumber industry. Another day will probably be devoted to the problems of the municipal forests, and other days to other typical problems of the forest products industry.

FIRE FIGHTING COSTS

THE federal government spent $2,500,000 fighting forest fires in the Inland Empire during the 10 weeks of fires last summer, according to a statement by R. W. Fraser, forest supervisor. The district covers northeast Washington, northern Idaho and western Montana. "This is a record-breaker for expenditure," said Mr. Fraser. "The many fires and the long season of fire fighting this year was also very unusual."

BOUQUETS

"I wish to compliment you, yes, congratulate you, on the excellence of your magazine. To be identified with your organization as a member I prize very highly indeed."

A. F. BLOOMER.

"We all enjoyed the December number of AMERICAN FORESTRY. The illustrations are very wonderful."

MRS. E. F. ROSSITER.

"I believe that the AMERICAN FORESTRY magazine is today doing more good to the country than any other."

MARTA SCOTT CONSER.

"Every number of AMERICAN FORESTRY is a treasure."

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MARIA WHITE AVERILL.

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F. E. WHITNEY.

"I wish to congratulate you very heartily on the January number of AMERICAN FORESTRY. It is superbly good and absorbingly interesting."

HENRY S. DRINKER,
President of Lehigh University.

"AMERICAN FORESTRY is a most valuable and interesting magazine and I recommend it widely."

MARY LATHROP TUCKER,

"I appreciate the good work done by the Association in the two years just past and congratulate you on having come through a difficult time with success. I wish for the Association an ever greater degree of usefulness and an ability to carry out its new work."

HARRIETT E. McBRIDE,

TREE PLANTING IN CHINA

AMERICAN college girls are introducing Arbor Day as an international holiday into China. Reports from Ginling College, Nanking, China, tell of the fourth annual tree-planting by students of the college and the setting out of plum and mulberry trees in honor of the Sisterhood of Women. Ginling College, founded in the ancient Chinese capital, is the third of the Union Colleges now established in China by five of the American missionary boards of the different denominations.

KILN DRYING TAUGHT BY MAIL

THE manufacturer who uses lumber as a raw material must give more attention to kiln drying than has hitherto been the common practice, or the resulting excessive waste and dissatisfied trade may cause embarrassment. The time has come when the average dry kiln operator must either improve his methods or give way to a more progressive man who has learned and kept in touch with more modern methods.

The high cost of lumber and labor, a shortage of thoroughly airdry stock, as well as a general movement for efficiency in production make better methods imperative. Losses due to inadequate methods of kiln drying, especially of stock which is not thoroughly air-dry, often run as high as 30 to 50 per cent, and occasionally even 100 per cent of the value of the lumber. A high percentage of loss is often taken more or less for granted and its seriousness not considered. Present conditions, however, will force the facts to the attention of the manufacturer. Improper kiln operation means not only a loss of lumber and time, but also poorer goods, fewer orders, less profits, and finally the loss of trade to more alert and up-to-date competitors.

Kiln drying of wood is not just a job. It is an art based upon exact knowledge. It requires an understanding of certain fundamental principles, and their application in the daily operation of the kiln. To be efficient the operator must be up-to-date in his methods relative to the best present practices.

Within recent years the principles underlying the successful kiln drying of air-dry and green lumber have been worked out by the United States Forest Products Laboratory, which is maintained in co-operation with the University of Wisconsin.

The Wisconsin University Extension Division has arranged to disseminate some of this information by means of a ten-lesson correspondence-study course. The course is written in simple language, and the text is supplemented with numerous illustrations.. It is open to anyone with a common school education. The lessons do not apply to any particular type of kiln, but rather to the conditions necessary in any kiln in order to bring about good results in the drying of various kinds of lumber.

The course is conducted by Mr. Arthur Koehler, of the Forest Products Laboratory, who, on account of his connection with the institution, is in close touch with the latest developments in kiln drying practice. A nominal fee is charged to cover a small per cent of the expense involved in rendering this service. For further information address the Extension Division, University of Wisconsin, Madison, Wis.

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Students from other states will be allowed to enter provided there is no four-year forestry course given in their state.

For further information address,
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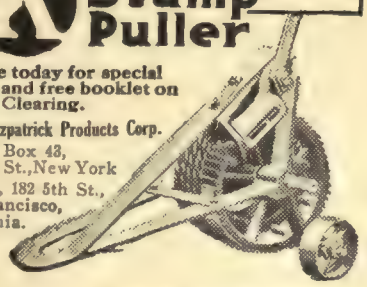
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SALE OF TIMBER,
MESCALERO INDIAN RESERVATION,
ELK AND SILVER CREEK UNIT

Sealed bids in duplicate, marked outside "Bid Elk and Silver Creek Unit," and addressed to Superintendent Mescalero Indian School, Mescalero, New Mexico will be received until twelve o'clock noon, Mountain Time, Saturday, May 1, 1920, for the purchase of timber on a tract within the Elk and Silver Creek drainage areas on the southern part of the Mescalero Indian Reservation lying west of the range line between ranges 14 and 15 East of New Mexico Principal Meridian. The said unit includes about 30,000 acres of unallotted timber land with an estimated stand of one hundred seventy million feet as to which contract will be made with the superintendent. Approximately 55 per cent of the timber within the unit is western yellow pine (including so-called "Black Jack" or "Bull Pine.") 30 per cent Douglas fir and 15 per cent white fir. Mexican pine and Engelmann spruce. Each bid must state the price per thousand feet Scribner Decimal C Log scale that will be paid for timber cut and scaled prior to April 1, 1925 Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three year periods. No bid of less than three dollars ($3.00) per M feet for yellow pine and Douglas fir, two dollars ($2.00) per M feet for Mexican white pine and Engelmann spruce and one dollar ($1.00) per M for white pine during the period ending March 31, 1925 will be considered. Each bid must be accompained by a certified check on a solvent national bank, payable to the Superintendent of the Mescalero Indian School in the amount of ten thousand dollars ($10,000.00). The deposit will be returned if the bid is rejected but retained as liquidated damages if the required contract and bond are not executed and presented for approval within sixty days from the acceptance of a bid. The right to reject any and all bids is reserved. Copies of the bid and contract forms and other information may be obtained from the Superintendent, Indian School, Mescalero, New Mexico.

CATO SELLS,
Commissioner of Indian Affairs.

Washington, D. C., February 14, 1920.

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

THE opening of the spring semester in January showed a decided increase in enrollment in the various forestry curricula and courses. Twenty-two men were enrolled in the curriculum in general forestry. Ten are taking up the work in forest utilization and seven have entered the five-year combined course. In the beginning course in forestry which is open to all students in the University, Professor Mulford is lecturing to one hundred and forty-eight students. Nine sections have been formed in this course for recitation work, the texts used being the following: Primer of Forestry, Gifford Pinchot; Our National Forests, Richard H. D. Boerker; Forestry and Community Development, S. T. Dana; Farms, Forests and Erosion, S. T. Dana.

The Friday morning conference course for all members of the forestry faculty and upper division students is proving of great interest and value to all concerned. The topic "Are Foresters Necessary" after much discussion was finally settled very decidedly in the affirmative. The concensus of opinion was that the period of greatest promise and usefulness for trained foresters in the United States is just beginning.

The forestry club held its first meeting of the semester under the leadership of the newly elected officers on the evening of January 27th. Over fifty men were present, thus establishing a record for attendance. A committee reported on conferences with the Labor Day Committee of the Associated Students in the matter of the planting of a memorial grove of the *Sequoia gigantea* on the campus to the California men who fell in the war. The only objection seems to be that it is not a large enough project to keep the whole student body busy, but the committee have hopes that it may be done in connection with some other piece of work.

Earl M. Blair, '20, was elected vice-president of the Intercollegiate Association of Forestry Clubs and was California's representative at the meeting of this Association held during the last week in February at New Haven. The sum of $175 was raised by active members of the Forestry Club towards defraying the expenses of the delegate to this meeting and an appeal to alumni was made for assistance in completing the necessary sum. The California Club believes heartily in the Intercollegiate Association as a means of better understanding between foresters from the several schools. Delegates to former meetings have brought back much of value and we believe the recent meeting will be well worth the expense involved.

Following the student self-government plan which is in effect throughout the University, the men who are going to the forestry camp in Plumas County next summer, held a meeting last week to arrange details of the camp commissary and other matters in connection with the 13 weeks course in the woods. Tom Oliver was elected camp manager.

Professor Mulford is planning to take the senior students on a week's field trip to the Del Monte Forest in Monterey County. This is one of the very few forest properties in the United States which is under intensive management so that opportunities for field students in silviculture are particularly good.

OREGON STATE SCHOOL OF FORESTRY

C. J. BUDELIER, a graduate in Logging Engineering of the Oregon School of Forestry, has been made woods foreman for the Portland Lumber Company at their Coweman camp near Corrals, Washington.

W. J. O'Neil graduated in Logging Engineering at the Oregon School of Forestry in 1917. He entered the service before commencement day and remained with the war game until the finish, returning from France with a commission as second lieutenant in the artillery. For the past few months he has been employed by the Alsea Lumber Company as assistant engineer. Recently he has been promoted to the position of chief engineer.

C. A. Fertig, graduate in Logging Engineering with the class of 1917 from the Oregon State School of Forestry, has recently identified himself with the Forest Products Sales Company of Astoria, Oregon.

PAUL C. FUGH, a Chinese student in the School of Forestry of the Oregon Agricultural College, is employed by the Y. M. C. A. in France. His particular business is to look after the interests of Chinese laborers who were brought into France by the Allies during the war.

A letter from Eastern Siberia states that L. D. Yates, a graduate of the School of Forestry, now first lieutenant in the regular army, is with the A. E. F. in that region. He writes that keeping warm and holding the Bolsheviks quiescent occupies his time completely.

At a recent meeting of the Board of Forestry of Oregon, H. J. Eberly, a graduate of the School of Forestry of the State College, and recently a captain in the Twentieth Engineers, has been appointed Deputy State Forester for Oregon.

At the December meeting of the Forestry Club, R. A. Chapler, of the Federal Forest Service, gave an interesting address

before the club on "The Progress of Protection." Chapler is now in charge of the Co-Operative Production work in District 6 under the Weeks' law. Among other things Chapler suggested that the time is ripe for the development in the Forest Service of a man of sufficiently distinctive training to be designated as a Protection Engineer.

Early in December Professor Boul, head of the Logging Engineering Department, took the senior class in Logging Engineering, onto the operations of the Gerlinger Logging Company near Corvallis, and made a final survey for one mile of main line logging railroad and a preliminary survey of another mile. This is practical work and is accepted by the Logging Company as a basis for their railroad construction.

PENNSYLVANIA STATE COLLEGE

FOR several years, owing to crowded conditions, The Pennsylvania State College has not admitted students from outside the State. The Fall of 1920 over 600 Freshmen were turned away, most of them being from Pennsylvania. This action, however, seemed to work an injustice to students applying for Forestry from states that do not have a four-year Forestry School. Inasmuch as the School of Agriculture at State College, of which the Forestry School is a part, is largely supported by Government funds, the Trustees of the College have recently decided that students applying for Forestry from States not having a four-year course in Forestry will be allowed to enter the College.

PURDUE UNIVERSITY

SEYMOUR MAZUR, who was graduated from the Department of Forestry at Purdue University, at Lafayette, Indiana, with the class of 1915, has recently become connected with the State Forestry Company, of Indianapolis, as a member of the firm. Mr. Mazur was recently discharged from the army, where he had a good record, and his new connection is a further recognition of his ability as a forester.

George Kunkel, of the class of 1918, has left the employ of the Forest Service to take up work with a private lumber company, as a timber cruiser at Eureka, California. Mr. Kunkel's work is chiefly in the redwood belt. He is very optimistic regarding the future in this field.

John S. Matthews, 1917, is now with a lumber company with headquarters at Scotia, California.

Mr. William Malcolm, M. S., Purdue, 1914, an early graduate of the department, has recently entered into a long term contract with the well-known school at Saint-Marys-of-the-Woods, to landscape and reforest their large grounds.

Plans are now being formed for the establishment of a summer camp for the Department of Forestry. It is likely that the camp will be held in connection with the Civil Engineering Camp on the upper end of the lower peninsula of Michigan. At this camp various problems of forest mensuration and organization will be worked out. The extreme proximity of the camp to actual woods operations, makes it a very desirable site. All sophomores will here receive first hand information on wood and camp life as well as supplement their lecture room experience with practical outdoor demonstrations.

NEW COURSES AT SYRACUSE

THE importance of dry kiln engineering in connection with forestry instruction is realized by the New York State College of Forestry at Syracuse, and a course in this subject is offered, to begin March 1. A recent graduate of the College of Forestry who specialized in dry kiln work has been given a job paying $7,200 a year in India on a three-year contract.

Another course to be offered for the same term at Syracuse is to give special training in timber grading. This is becoming of increasing importance with the high prices of lumber now existing, for the timber grader is able to save his employer large sums by a technical knowledge of various kinds and grades of lumber. The applications so far received for these courses come from men now engaged in the lumber industry, and their employers are paying the expenses of those who already registered for the two courses.

YALE FOREST SCHOOL

W. STUART MOIR, M. F., Yale 1917, who is at present in Sweden studying forestry as a Fellow of the American Scandinavian Foundation, reports that studies are being taken up at the State Forest School near Stockholm. Extensive trips are planned to the western and northern parts of the country to visit the leading saw-mills and pulp plants, and to study the technical management of the forests. Particular attention will be paid to the management of forests for pulp wood production and the securing of natural regeneration of cut-over lands, and a careful study will also be made of the particular application of the State regulation of the cut on private timberlands, together with the requirements for reproduction on these lands with a view to continuous forest production.

MAINE'S SPRUCE SUPPLY

"ONE third of the growing spruce of this country is on the soil of Maine today," said Senator Fernald, of Maine, in a recent address before the paint and varnish men of the country. "We have 22,750,000,000 feet of spruce growing here and we can cut 750,000,000 feet every year from now until the end of time and have just as much growing and we can with proper consideration furnish the cities of the United States with all the paper they need."

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C. (3-5-20)

WANTED—Working Assistant Forester for local Forestry Department in connection with forestry work in parks, nursery and landscape planting. Good opportunity for ambitious young man not afraid of work. State qualifications, salary expected and references. Address Box 890, care of American Forestry. (3-6-20)

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

HOYT'S ANTISEPTIC TREE VARNISH

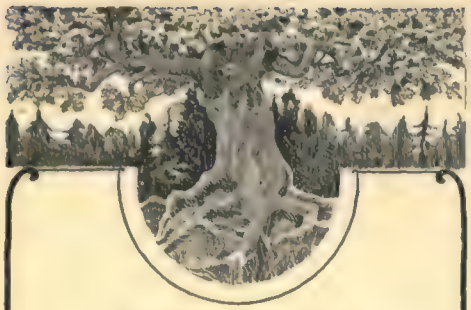
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SALE OF TIMBER, KLAMATH INDIAN RESERVATION
CHILOQUIN UNIT

SEALED bids in duplicate, marked outside "Bid, Chiloquin Timber Unit" and addressed to Superintendent, Klamath Indian School, Klamath Agency, Oregon, will be received until twelve o'clock noon, Pacific Time, Thursday, April 15, 1920, for the purchase of timber on a tract, in townmanship 35 and 36 south, ranges 7 and 8 east of Willamette Meridian in Klamath Indian Reservation, lying south of the Sprague River. The said unit includes about 10,000 acres of unallotted land with an estimated stand of one hundred sixty million feet as to which contract will be made with the Superintendent and about three thousand acres of allotted lands with an estimated stand of forty million feet as to which separate approved contracts with the Indian owners may probably be made. More than ninety per cent. of the timber within the unit is western yellow pine and the remainder is sugar pine, incense cedar, and red and white fir. Each bid must state the price per thousand feet Scribner Decimal C. Log scale that will be paid for timber cut and scaled prior to April 1, 1924. Prices subsequent to that date are to be fixed by the Commissioner of Indian affairs by three year periods. No bid of less than three dollars and fifty cents ($3.50) per M. feet for yellow pine, sugar pine and incense cedar, and one dollar and fifty cents ($1.50) for other species during the period ending March 31, 1924 will be considered. Each bid must be accompanied by a certified check on a solvent national bank, payable to the Superintendent of the Klamath Indian School, in the amount of Twenty Thousand Dollars ($20,000.00). The deposit will be returned if the bid is rejected but retained as liquidated damages if the required contract and bond are not executed and presented for approval within sixty days from the acceptance of a bid. The right to reject any and all bids is reserved. Copies of the bid and contract forms and other information may be obtained from the superintendent, Indian School, Klamath Agency, Oregon.

Washington, D. C., January 21, 1920. CATO SELLS, Commissioner of Indian Affairs.

ALASKAN PULPWOOD FORESTS

THE pulpwood forests of Alaska, which are chiefly spruce and hemlock, would possibly produce under careful management a continuous yield of 2,000,000 cords per annum or about one-third of the present consumption of pulpwood and products manufactured from pulpwood in the United States, according to a recent circular of the Newsprint Service Bureau.

The National Forests of Alaska have a coast line of 12,000 miles and are estimated to contain 77,000,000,000 board feet of standing timber. Within the last ten years the Forest Service has sold 420,000,000 feet of timber in the Alaskan forests, from which have been produced lumber, box shooks, railroad ties, piling, etc., but no pulpwood. With its limited funds for timber surveys, the Forest Service has been handicapped in exploring the timber resources of the territory but has exerted every effort to develop the use of these resources. Various tentative applications for developing pulpwood enterprises in Alaska have been since 1910 but these have been for the most part dropped because the applicants found they could not finance the enterprises. The pulpwood offered has been priced at low rates, conforming to the general sale of stumpage prices in Alaska, representing the very low timber values obtaining in an inaccessible and undeveloped region. The Service has felt it necessary in the public interest to provide in its contracts for a reconsideration of these stumpage values at intervals of five years, beginning when actual cutting operations commence, with an opportunity to increase the stumpage prices if an expert appraisal showed the pulpwood to have actually a higher current value.

The sale terms offered by the Forest Service have not delayed the development of this industry but the obstacles have been the enormous transportation difficulties, involving prohibitory freight rates, the lack of labor and of towns, wharves and all supply facilities, and the very large investment required for installation of paper and pulp plants.

REPLANTING INVESTIGATION

THE NATIONAL RESEARCH COUNCIL has received a gift from the Southern Pine Association of $10,000 to pay for the incidental expenses of a co-ordinated scientific study by a number of investigators of the re-growth of trees on cut-over forest lands with the aim of determining the best forestry methods for obtaining the highest productivity. Although some of these cut-over lands can perhaps be most advantageously used for agricultural purposes there is a large acreage of them which will yield better returns if devoted to reforestation.

Despite the large amount of forest study that is being conducted under Government and State auspices, there is much need for additional investigation. This is well recognized by lumber men and is especially indicated by the action of the recent meeting of the Southern Forestry Congress at New Orleans in formally endorsing the scientific projects of the National Research Council in regard to forestry. The gift from the Southern Pine Association is made as a result of this action. The investigation will be conducted under the advice of the Research Council's special committee on forestry and will not duplicate any present government or other undertakings along similar lines.

PULPWOOD IN QUEBEC

THAT the Province of Quebec has more than one-half of the entire pulpwood supply of Canada and the largest unit of forest wealth in the world is the claim of the Prime Minister of the Province, according to the United States Consul General at Ottawa. The Prime Minister further stated in the address quoted, made to the members of the Canadian Pulp and Paper Association, that there had now been cut about 1,000,000,000 feet of timber, and he was informed that, with proper management, there might be cut four or five times more than that without endangering the future supply. He emphasized the importance of keeping the raw material for the use of the Canadian pulp and paper plants, and indicated that this policy would not be relaxed, suggesting that the Provincial Government might act further and that the time might come when they would have to limit the cut of the Quebec forests for the exclusive use of Quebec mills. Quebec has been an important source of supply to the paper mills of the United States.

TO REFOREST BURNED AREAS

EIGHT million trees are sprouted at the Savanac nursery, Washington, every year to reforest the burned areas in the United States forest district No. 1, which takes in parts of Montana, Idaho and Washington, according to L. A. Fairchild, government tree-planter. "There are two tree-planting seasons in the year," said Mr. Fairchild. "The first begins April 1 and lasts until June 15 and the fall season is from September 15 to November 1. There are four tree-planting camps in this district and two crews of 16 men in each camp. A good camp with favorable conditions will plant 1,000,000 trees during the three months of work and an expert planter will put in 800 trees every day. "The majority of the burned areas will reforest themselves. We are concerned with the other sections. Crews are sent out early in the year to map out these sections which show no signs of self-reforesting." Mr. Fairchild said that the Savanac nursery at Haugan, Montana, is the largest in the United States and that D. C. Olson, superintendent, is one of the best known tree experts in the country.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

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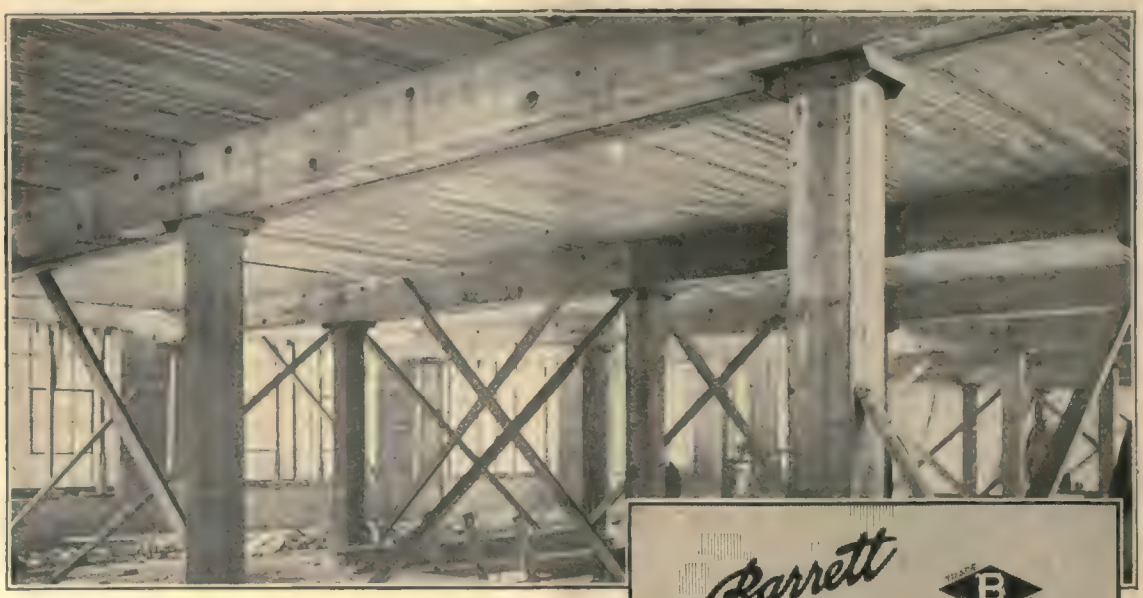
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AMERICAN FORESTRY

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EDITORIAL

CRIPPLING FOREST INVESTIGATIONS

THE Agricultural bill as passed by the House of Representatives, reduced the appropriation for forest investigations in the Forest Service from $78,728 to $35,000, or more than half. This appropriation has been granted by Congress for the past eight years. The Senate Committee increased the amount to $105,000. At this writing the conferees of the House and Senate are considering this and other forestry appropriations.

The reduction of $43,728 made by the House, if finally passed, will make it necessary to close down all of the Forest Service experiment stations located at Priest River, Idaho, at Colorado Springs, Colorado; at Flagstaff, Arizona, and at Stabler, Washington. Some of these stations, like the Arizona and Colorado Stations, have been in existence for the last ten years. It will further mean a great crippling, if not the entire abandonment, of the more general forest investigations now carried on in the States of California, Oregon, Utah, Montana, and the hardwood region of the eastern United States. It will mean the dropping from the rolls of 10 or 12 men, some of whom have been in the forest research work for the last 12 or 15 years. It will mean the abandonment of hundreds of experimental plots and records secured with infinite patience and sacrifice on the part of enthusiastic investigators in the course of more than a decade. It will mean setting back the experimental work in the country for another 15 years, since in forestry it takes years of most arduous work to build up sufficient evidence for any definite conclusions and secure a complete investigation force.

If anything has proved beyond doubt its value during the war it is the application of science to modern industrial and military efficiency. Just at a time when scientific work is at last coming into its own, if it cannot be stimulated it should not at least be crippled by any near-sighted policies of economy. If any effort has more than paid for its cost it has been scientific effort. The National Research Council, the leading scientific body in this country, and the leaders of industry, all unanimously testify to this.

It is very unfortunate that this blow to forest investigations should come at a time when the people throughout the country are at last aroused to the critical situation of our timber resources and are asking for additional appropriations for experiment stations in New England, the Southern Appalachians, the Lake States and southern California. This demand on the part of an awakened public opinion manifested itself in the introduction of eight bills now pending in the House and Senate and providing for the establishment of new experiment stations in different parts of the country.

This drastic reduction in the appropriation for forest investigations is a very near-sighted economy at a time when the exhaustion of our timber resources is so clearly in sight, when the prices for lumber have reached levels almost prohibitive for the ordinary user of wood, when many industries in the United States today are suffering because of a shortage of wood supplies, as is too clearly manifested by the critical situation in the production of newsprint, and when the country needs more than ever before knowledge as to the best handling of our remaining timberlands. The question of a National Forest policy for the country is now being widely discussed by the wood-using industries, in trade journals, and the general press, and there is no doubt but that legislation of one kind or another will be sought in the near future to provide for measures which will protect the remaining forests from devastation and encourage forest practice by private timber owners as well as by States and municipalities. All such measures, unless they are based on accurate scientific knowledge of the best methods of handling the timber lands and securing natural or artificial reforestation, may prove of little effectiveness. Forest experiment stations are just as indispensable to the growing of timber as agricultural stations are to the production of farm crops.

The curtailment in the appropriation for forest research is particularly deplorable because it comes at a time when the forest experiment stations are just beginning to reach the period of their greatest efficiency and usefulness.

Forest investigations on the National Forests resulted in increasing the revenue from them by developing methods of cutting which, as in the case of the Douglas fir on the Pacific Coast, have saved thousands, if not hundreds of thousands, of dollars to the Government in the form of timber which otherwise would have to be left for seeding purposes. Some of the discoveries made at the stations repaid to the Government many times over the entire cost of all expenditures for their establishment and maintenance for many years to come. Their elimination in reality means, therefore, not economy, but a loss since without them increase in productivity of our forests must be trusted entirely to chance.

PROTECT THE HEADWATERS OF NAVIGABLE STREAMS

THE wisdom of purchasing forest land at the headwaters of navigable streams under the Weeks Law has been demonstrated. When, therefore, the appropriations have been used up, and the question arises of continuing the policy, the appeal is wide and strong. New bills in Congress propose two million dollars a year for five years.

But Congress does not grant large sums without knowing the reason, especially in the face of an expected deficit of three billion dollars in the year's payment on the war debt. It is up to the friends of this measure to show its transcendant importance, and this can be done. It involves not only the timber supply in the Eastern country where population is dense, and the preservation of the soil over vast tracts of mountain range from fire and erosion, but also the even flow of streams and the regulation of water powers in more than twenty states with hundreds of thousands of operatives dependent upon steady power at the millwheels.

Take, for instance, the regulation of stream flow in any single valley in New England like the Connecticut or the Merrimac. Each has hundreds of factories and electric plants. What myriads of electric lights depend upon an even flow from the great White Mountain watersheds. Or, take the Ohio River. Any one who has experienced the terror of floods at Pittsburgh or Cincinnati when millions of property are destroyed and many hundreds of people driven from their homes, realize how essential is control in the mountains of West Virginia. Forest soil is said to hold back five times its own weight in water. It is this extraordinary fact that keeps mighty rivers flowing. Members of Congress and everybody else should know that this precious mountain soil is inflammable and that a slash fire destroys it ten thousand acres at a time. Whole mountains are reduced to barren rock.

Or take the matter of timber supply. In the country as a whole, as everybody knows, we are using up our timber much faster than it grows. Already we are feeling the pinch of excessive prices, due to the exhaustion of certain species. Lumber prices have greatly advanced and yet felling operations throughout the highest mountain slopes are advancing as never before. Near the summit of Mt. Mitchel, in North Carolina, at an elevation higher than Mt. Washington, one beholds the worst timber slash in Eastern America, with the black crisp soil where fires have swept over thousands of acres. Pitiable and damnable are the adjectives most appropriate; pitiable because the country has not seen the facts, and damnable because the results are everlasting.

The American Forestry Association has supported the Weeks Law first, last and all the time. It stood for the original appropriation of eleven million dollars that was passed by Congress and approved by President Taft in 1911. It urged in 1916, the reappropriation of the three million dollars that did not become available under the first act. It favored action by the present Congress that made an appropriation of $600,000 last July to continue purchases for the current fiscal year.

If the American people believe in this enterprise, now is the time to say so in tones that Congress cannot fail to understand. Nothing but a majority of votes in both Houses of Congress will secure its continuation.

TAKING ADVANTAGE OF THE FARMER

COMPARATIVELY little attention has been called to the profiteering in timber which some small sawmill operators, owning chiefly portable or semi-portable mills, have been practicing in this country. Reference is made to their buying stumpage at low rates largely from farm woodland owners. It is not a new form of taking an undue profit. There is no way of telling what percentage of small operators practice it, but it would seem that many of the operators in various sections resort to it. The effect upon the honest operators is obvious, it lays them open to suspicion, makes it more difficult for them to do business with timber owners, and puts them at a disadvantage financially. It is to their interests, to the interests of farm woodland owners, and in the interests of the practice of forestry in the United States, that this profiteering be stopped.

Standing timber on farms lends itself easily to profiteering, due in the main to three facts.

The first is that, in the very nature of things, there being so many variable factors, the value of stumpage can not be determined with the closeness of the value of a calf or a crate of eggs.

The second is due to the common methods of selling it, by the lump sum for the tract, or at a stated price per acre without estimate on the part of the owner.

The third is the average farm woodland owner's unfamiliarity with the business of sawing and selling lumber and other products, a business in itself.

One cannot blame the sawmill man for buying as cheaply as he can. The writer knows one firm which never attempts to force down a farmer's price. This particular firm was offered, and it purchased, several million feet in well located small tracts in the last year at about $6.00 per thousand feet on the stump. Quite a proportion of this timber was second growth white pine and white oak. It would have been cheap at twice the figure paid. The attempt, however, to force down figures by claiming a high percentage of the timber to be defective when such is not the case, of grossly under stating the total amount of stumpage and assuring the owner positively of the truth of the figures, of trying to "beat

down" the price on the ground of long-standing friendship of the families—the writer knows instances of each of these—and other unfair practices, cannot be condoned.

Many farm woodland owners will not pay any real attention to growing timber unless it pays them in dollars and cents to do so; they cannot make their operations profitable at the price profiteers pay for timber. The country's needs demand that their lands be made as productive as possible. Profiteering in the timber of our farms must cease.

RIGHT ABOUT FACE TO THE FIRES

THE forest fires in the Northwest last summer and in Minnesota the year before challenge the effectiveness of our work in forestry. They point sharply to the immediate, urgent need in the woods of the North and West. Thousands of acres of timber and of young growth are destroyed every year or two, and dozens of lives are lost.

No measures for the establishment or maintenance of productive forests, other than fire protection, are worth while until adequate fire protection becomes an accomplished facts. Forest plantations, and special fire protection on publicly owned lands are both accomplishing a little, but the progress is far too slow, and very expensive. The result is net loss. The woods call for adequate fire protection now, on the privately owned lands. Protection of natural young growth from fire is the cheapest, most effective method of reforestation.

The methods of fire prevention and control in the various types of forest are well understood, and adequate results are possible.

Democratic government is instituted to protect life and property. When timber was cheap and abundant, lack of fire protection was excusable, but this condition is past. Protection of forests from fire, like protection of any other property of value, is a normal, police duty of government. It can be administered practically under the authority of the state governments, or by co-operation of the Federal government with the state governments, and expenses can be met under any one of several co-operative methods between the Federal and state governments and the landowner, as local conditions may render practical.

The work to be done now is to make certain that appropriations and legislation for thorough fire protection have the right of way.

A NATIONAL FOREST POLICY PROGRAM

DR. B. E. FERNOW, in an editorial utterance in the *Journal of Forestry,* says of the action of the American Paper and Pulp Association in accepting a report of its committee on Forest Conservation with suggestions for a national forest policy: "It takes the position that there is 'no basis for any legal compulsion upon the private landowner to keep his land forested except in cases where after proper classification and indemnification it may be decided that the general welfare demands watershed protection,' but it admits that the private owner 'is under both moral and legal obligation to handle his property in such a way that it does not become a public menace and the State may require him to conduct his cutting operations in such fashion as to lessen the fire danger.' It declares that 'the production of large-sized timber is too long an undertaking with too great hazards and too low a rate of return to attract private capital in adequate amount.' It advocates a forest survey and land classification; public purchase of cut-over lands by National and State governments in co-operation, and also more vigorous extension of Federal co-operation with the States in fire prevention; fair forest taxation laws; a very large program of forest planting; nurseries and working plans and other means of aiding reforesting operations, especially for smaller land holders; and a definite policy in operating State-owned lands. It is also admitted that some paper and pulp concerns might practice forestry on their own lands.

"With this attitude and program," says Dr. Fernow, "we can certainly not find any fault. It expresses all that we have contended for as practicable means for carrying out a national forest policy. What we need now are definitely drawn acts of legislation."

SHADE TREES AND FOREST CONSERVATION

IN his Arbor Day proclamation the Mayor of Dallas, Texas, not only calls attention to the value of shade trees but adds this significant paragraph: "The forests of this nation and of this state are being depleted to an alarming extent. Insect pests and enemies of trees are rapidly increasing, and it behooves us to adopt strenuous measures to save the trees we have, and to insure a source of timber supply for the future."

The Mayor recognizes the fact that if people are interested in shade trees they are likely to be receptive of ideas about forest conservation. Editors throughout the country who have been giving liberally of the space in their newspapers to forestry publicity and shade tree publicity have frequently expressed the same thought in their editorials, and we read of many organizations which having planted roadside trees or memorial trees are now discussing the need of a national forest policy, and are ready to lend their assistance in the effort to secure it.



COLONEL W. B. GREELEY

WHO HAS BEEN APPOINTED CHIEF OF THE UNITED STATES FOREST SERVICE IN PLACE OF COL. HENRY S. GRAVES, WHO HAS RESIGNED. COLONEL GREELEY IS A DIRECTOR OF THE AMERICAN FORESTRY ASSOCIATION.

FORESTRY IN THE DOUGLAS FIR REGION

BY THORNTON T. MUNGER, UNITED STATES FOREST SERVICE

"WESTWARD the course of empire takes its way!" The expanding population of our country moved westward and as it went it took with it all the pulsing activities that accompany the modern industrial empire—the making of cities where none were before, the construction of Herculean transportation systems, the establishment of industries to supply the needs of the people, the eager harvesting of the great wealth of natural resources. It was primarily the wealth of natural resources that directed the march of progress to the westward in this country—the virgin fertility of the soils, the mineral riches of the mountains and the vast expanses of splendid forests. Following closely on the steps of the prairie schooner emigrants who came to till the rich Western soil and of the Forty-niners who came to mine the Western gold, came the lumbermen to harvest the primeval crop of timber which Nature had sowed and which stood ripe for the ax. The lumber industry has been moving westward with the march of progress; it has always been a pioneer industry, one of the forerunners of intensive industrial development, and has reached its peak of production in every territory before that territory has become fully peopled and developed intensively agriculturally and industrially. That has been the history of most of the forest regions of the country. The lumber industry has been self-annihilating. But need it be so? Certainly not, when so much of the virgin forest land is suited primarily for the production of timber crops as is the case in the Western forest regions. It is interesting to speculate, therefore, as to whether the history of the Central Hardwood Region, of the Lake States Pinery, and of the Southern pineries is to be repeated in the Douglas fir region of the Pacific Northwest.

The forests of Western Oregon and Washington contain the largest reservoirs of virgin timber left in the United States; and a large proportion of the lumber used by the country comes from this region. Washington has, since 1905, held foremost place among the States in quantity of lumber produced; Oregon now ranks third in production, but first in volume of standing timber, and it will not be long before the increasing annual cut will place her at the head, or next the head, of timber-producing States.



PRIMEVAL DOUGLAS FIR FOREST IN THE FOOTHILLS OF MOUNT ST. HELENS, SOUTHWESTERN WASHINGTON

Fifty years ago there were twenty million acres of such dense virgin forest, extending in an almost unbroken strip from British Columbia to Southern Oregon and from an altitude of 3,000 feet on the Cascade Range to the Pacific Ocean.

The volume of standing timber in these two States is enormous; from the mountain tops the expanses of solid virgin timber appear limitless, and expressed in board feet the amount seems inexhaustible. But logging on the watersheds available to transportation is progressing with alarming rapidity, and it is high time that these States decide whether their timberlands are to be "mined" of their virgin resources and abandoned as unproductive,

or whether their forests are to be cut with a thought for the future, the land kept in a timber-producing condition, and the important lumber industry perpetuated indefinitely. Action should be taken accordingly.

What is the forest problem of the Douglas fir region of Oregon and Washington, how may it be solved, and what is being done to solve it?

A half-century ago there was a practically unbroken stretch of forest, either old or young, from timberline on the Cascade Range to the Pacific Ocean and from British Columbia to Southern Oregon. A few meadows and "prairies," especially in Oregon, and some rock barrens made the only breaks in the natural forest cover. Within the altitudinal zone suitable for commercial tree growth, i. e., below an altitude averaging about 3,000 feet, Douglas fir was the principal tree, and so this forest



A 54-YEAR-OLD "SECOND-GROWTH" FOREST OF DOUGLAS FIR

This is in Western Oregon, which originated from seed stored in the ground after a disastrous forest fire that killed the virgin timber. This view is taken on a sample plot upon which all the tagged trees are periodically measured and which by actual record is growing at the rate of 1,259 board feet per acre per year.

region is called the Douglas fir region. Upon the coming of the white man this region was by no means all covered with heavy virgin stands of old timber, for there is every indication that fires had played havoc in this country from time immemorial. Where these fires had run, second growth stands had nearly always replaced the old timber and consequently every gradation from the very young stands of seedlings to the old timber was found. In some places, particularly on the high mountains and adjacent to the valleys inhabited by Indians, too oft-repeated fires had annihilated the forest, and brush or grass had taken its place. Many of the stands of old timber had been so scourged with fire and yet not killed broadcast that they carried but a portion of the merchantable timber of a normal, well-protected forest. So it is that in the region as a whole—considering second-growth stands after burns, fire-scourged stands and all—the average stand per acre is only about 30,000 feet, whereas it should have been 100,000 feet per acre.

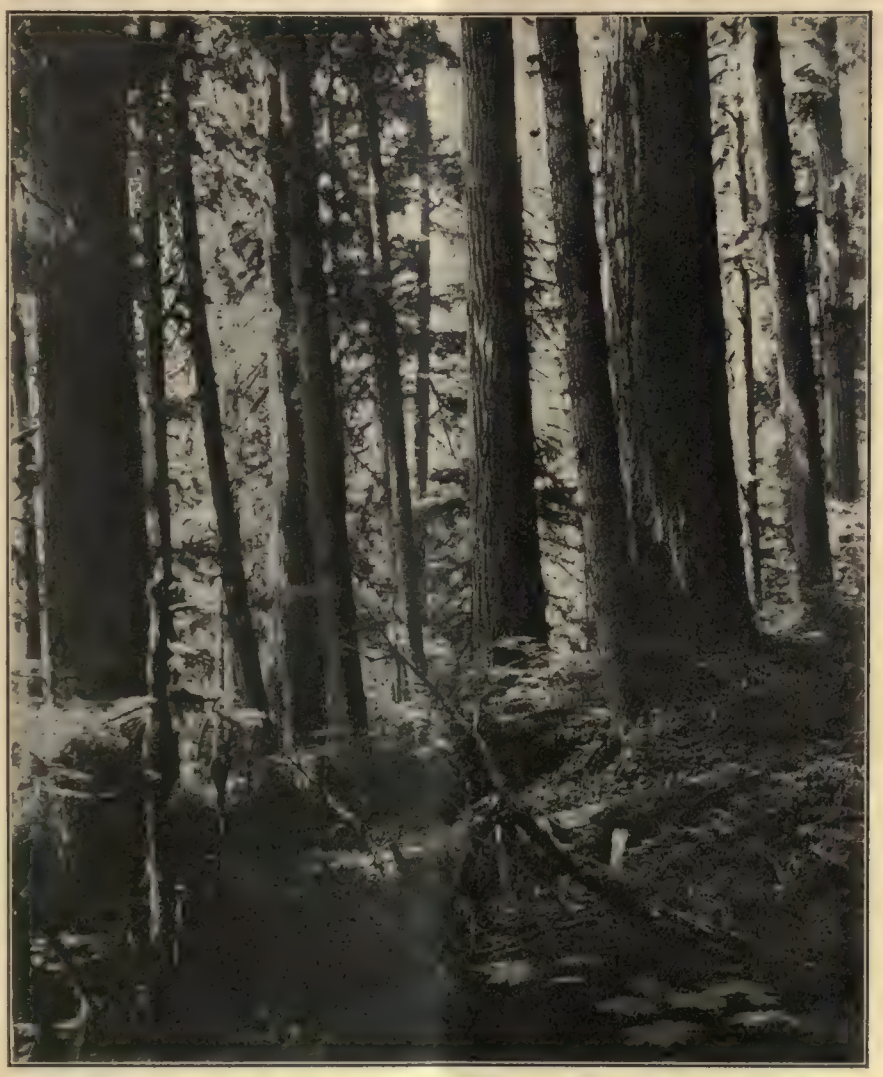
The following tabulation gives the best available estimates, some of them taken from scanty data, of the amount of merchantable timber and of the acreage of commercial virgin timber and of cut-over land within the Douglas fir region of Western Oregon and Washington, in both public and private ownership:

	Western Oregon.	Western Washington.	Total Douglas Fir Region.
	BILLION FEET, B. M.		
Merchantable Timber—			
National forests.....	85	65	
Private, State and Indian Reservation....	260	150	
			560
	ACRES.		
Virgin Timber Land—			
National forests.....	3,000,000	2,500,000	
Private, State and Indian Reservation....	7,000,000	4,500,000	
			17,000,000
	ACRES.		
Cut-Over, Not Cultivated—			
National forests.....	10,000	25,000	
Private, State and Indian Reservation....	1,200,000	2,500,000	
			3,735,000

The lumber industry did not develop to large proportions in the Douglas fir region until about 20 years ago. The annual cut of logs in Washington is now about 6,000,000,000 feet and in Oregon about 1,500,000,000 feet annually. This means the cutting over of nearly 200,000 acres annually in the western part of these two States. There is every indication that the industry has not reached its zenith of production, and that with the exhaustion of the Southern pine forests and the increase in the export business the Douglas fir forests are to be drawn upon even more heavily.

The customary logging practice—and the only one practically feasible with these large trees—is to cut clean and log the timber off with steam donkey engines. This method is not inimical to good forestry practice, for the silvical characteristics of Douglas fir and most of its associated species are such as to demand clean cutting. After the area is logged it is burned broadcast, often by accident, if not by intent, for the State laws require the burning of slash during the safe seasons to remove its menace to surrounding timber during the summer. This is well enough from the forester's viewpoint, provided the burning is done at the right season, for it has been found that when a Douglas fir slashing is burned over once immediately after logging there is almost sure to follow a dense stand of seedlings. The origin of this new crop has been somewhat of a mystery until the

investigations of the Wind River Forest Experiment Station brought to light the fact that the seed from the virgin forest lies dormant in the duff and humus of the forest floor, perhaps for several years; some of it escapes damage by the slash fire after logging and germinates the first spring thereafter. This accounts for the hillsides of magnificent reproduction on logged off lands and burns, where there are no seed trees which might have begotten such reproduction. Were these areas immune from fire after the first slash burning there would be no need for concern as to the future productivity of the Douglas fir lands of the Pacific Northwest. A second crop would be assured. But these logged off lands, even though once burned over by a terrifically hot broadcast slash fire, are far from immune from subsequent fires. The coarser debris is not consumed by the first fire, dry fern and weeds soon supply the kindling, and only a spark is necessary to start a fire which would run over the area a second or a third time. Sometimes an area burns over twice in one season. If all the seed stored in the ground germinates after the first fire, the second fire kills the seedlings, and if there is no source of additional seed in the near vicinity the chances for a second crop by natural agencies are very small. Sometimes the second fire is not severe and runs over the area in a crazy-quilt fashion, leaving islands of reproduction here and there. The irregular distribution of trees in many of the old forests is due to this process of partial burning of the first reproduction.



A TYPICAL CLOSE-UP VIEW OF A DOUGLAS FIR FOREST

This is in Western Washington, where the mature trees average 4 feet in diameter and 225 feet high. Such stands are now the scene of hundreds of logging operations, which are reducing to stump land about 200,000 acres of private land annually, without making any conscious effort to renew the forest growth.

This is the history to date of the logged-off lands of the Douglas fir region: A slash fire immediately following clean cutting; a crop of seedlings coming from seed stored in the forest floor; and then a second and a third and possibly even more fires which destroy what Nature sowed and which leave the area a waste of fern, blackberries, fireweed and brush, upon which Douglas fir will become established only by the slow process of migration or by artificial means. Sometimes, by a turn of fortune, an area escapes the second fire and the initial crop of seedlings survives and in 20 or 25 years reaches an age when, because of its dense shade, it is somewhat resistant to fire and gives promise of reaching maturity. Sometimes when the cutting has not been absolutely clean, defective cull trees are left and these act as seed distributors and restock the area in the event of a second fire.

There are many thousands of acres of logged-off lands in this Pacific Northwest covered by as pretty a stand of Douglas fir saplings as the forester could wish for. There are more which are devoid of adequate tree growth of any kind. The difference is due, on the privately owned lands, to chance, not to any conscous effort to secure a new crop. It is not unnatural that it should be so. The supply of virgin timber seemed inexhaustible and still seems so to the majority of people in Oregon and Washington, as it did in the Lake States and the Southern pineries 50 years ago; the fire demon seemed invincible, especially on the open cut-over lands. The timber land owner's chief concern was to protect the green timber; he had many troubles, and why should he concern himself with providing for a second crop when he had more timber than he could cut in 30 years, could afford to pay taxes and interest on and protect from fire. Meanwhile the public, which should be vitally interested in the continued productivity of the forest lands of the

commonwealth sat by and did nothing either to enforce, to make easy, or to help along the practice of forestry on private lands, not even lending moral support to the solution of the cut-over land problem.

One of the large factors in retarding a conscious effort to secure the reforestation of logged-off lands is the question of the future use of these lands. If they are useful for agriculture or pasturage, repeated fires are a benefit. The early logging was at the lower elevations on the bottoms and low, rolling hills, close to the settlements bordering Puget Sound and the Columbia River and its tributaries. The land was all suitable for agriculture and the lumberman had hopes of disposing of it for that purpose. As the logging has progressed farther back into the rougher mountain country the hope that this cut-over land might be sold to settlers at a profitable figure has persisted. This expectation of selling all kinds of logged-off land for farms —often stimulated by the unscrupulous land sharks—has postponed the initiation of action looking toward the practice of forestry on the ultimate forest lands. As a matter of fact, much of the land which is now being logged over is so rough or rocky that it is perfectly apparent that it has no agricultural possibilities and that it ought to continue to produce forest crops. Accurate figures as to the acreage logged over in the Douglas fir region of the two States are not available, but it is estimated that there are about 2,500,000 acres in Washington and 1,200,000 acres in Oregon cut over and not cleared. Added to these are many hundreds of thousands of acres of burns in a denuded condition. Of this perhaps a half is farm land—either plow land, pasturage, or incidental wood lots; the remainder is best suited to forest growth. Besides the cut-over land there remains in private ownership some 11,500,000 acres of virgin timberland (exclusive of burns and sparsely timbered areas). A larger proportion of this is ultimate forest land than of cut-over area. A conservative estimate of the ultimate forest land in the Douglas fir region of Oregon and Washington in private ownership—both cut-over, timbered and denuded burns—is 10,250,000 acres. Added to this there is a great acreage within the National Forests and a lesser amount in State ownership and in Indian Reservation. The area of commercial Douglas fir timberland in Federal ownership within the National Forests of Oregon and Washington is considered to be 5,000,000 acres, practically all of which is ultimate forest land. Altogether, then, there are, in round numbers, 16,000,000 acres of potentially productive permanent timberland in Western Oregon and Washington. This acreage is capable of producing 9,000,000,000 board feet per year, assuming an average growth rate of from 900 board feet per acre per year on the best sites to 450 board feet on the poorer sites. This potential capacity of these lands is in excess of the present lumber cut of the region. In other words, the great lumber industry of the Pacific Northwest might continue on its present basis *if*, and this is the "if" which must be settled by the people of the Northwest and the country right promptly, *if* intelligent and strenuous action is taken to effect the reforestation by protection of all ultimate forest lands as rapidly as they are cut over.



A HILLSIDE OF DOUGLAS FIR REPRODUCTION ON THE COLUMBIA NATIONAL FOREST, WASHINGTON

This was logged over in 1909 according to the dictates of good forestry, the slash burned the same year and subsequent fires kept out. Most of the reproduction came from seed stored in the ground; one of the seed trees left as an added assurance of natural reforestation is shown in the background.

If present methods continue, by which cut-over land is left at the mercy of fire and no conscious effort made to keep it productive, but a fraction of the potential increment will be realized. It is now only chance areas which become satisfactorily reforested after logging, and then it is due to the indomitable reproductive vigor of Douglas fir and hemlock and a fortunate escape from fire. The rest are left by the logger thoroughly denuded, scourged by repeated fires, and likely to remain unproductive for many years.

The securing of reforestation after logging in the Douglas fir region is not an insuperable task; it is simple in principle and requires no radical modification of present logging practice. Nature will do it alone, if she is given a chance and freedom from man-caused fires. The practice of forestry is here 99 per cent fire protection. As stated above, when the virgin forest is cut the seed is

in the ground. If the slash is burned immediately after logging and before the succeeding germinating season, which is the month of May, reproduction is almost sure to result. Then if the area is protected from subsequent fires, satisfactory reforestation is assured. Falling of the "snags" or dead trees is a most desirable fire-protective measure, for these in the event of accidental fire become torches which throw sparks high in the air and are the greatest hindrance to the suppression of a fire. If the burning of the slash is delayed too long after the logging, the reproduction resulting in the interim from the seed stored in the forest floor will be killed and reforestation will take place only from chance seed trees or from adjacent green timber, if any. For a further assurance of natural reproduction and as a precaution against accidental fires it is well to leave occasional seed trees—one or two to the acre should suffice. This is not a difficult or expensive provision for the logger to make, for in nearly all Douglas fir stands are misshapen and "conky" Douglas firs, which are so defective as to be hardly worth logging, yet are perfectly good seed trees.



A SECOND-GROWTH FOREST OF DOUGLAS FIR

This is typical of many in Western Washington and Oregon and is nearing merchantable age. Under proper methods of logging and fire protection the Douglas fir lands now being cut over can be made to produce successive crops of timber as fine as this.

The silvicultural prescription for the practice of forestry in Douglas fir region then condenses to this:

1. Log clean as at present.
2. Leave occasional defective trees as seeders, whenever such are available.
3. Fall the snags, which are a fire menace, at the time of logging.
4. Burn the slashing broadcast the first spring or fall after logging.
5. Keep subsequent fires out of the areas once burned.

The last provision is the one difficult of accomplishment and the one that costs money, but it means the difference between denuded wastes and richly productive second growth timber.

The reader may here ask what is being done to put these simple principles into practice, why is more not being done and what constructive action must be taken to put them into effect. It must be acknowledged that practically nothing in the way of a conscious effort to secure the reforestation of the cut-over lands is being done on private lands. There have been one or two sporadic attempts to practice forestry which were abandoned not because they were not successful but because the companies were more concerned with other problems of their business. On the National Forests the cutting of timber is, of course, done according to the above silvicultural principles, and has been in the main fruitful of good results. The still imperfect control of the fire menace is the only factor which has prevented ideal results.

More progress has not been made in the practice of forestry largely for one very good reason—the timberland owner is not interested in a long time proposition under existing conditions. You can prove on paper to him that cut-over land if cared for and protected will yield a crop in eighty or a hundred years which might net a fair rate of interest, but he is not in a mood to engage in any such long-term and uncertain investment. He is, at present, embarrassed by a surfeit of virgin timber which is expensive to carry. His business is gauged on a quicker turn over; his capital is needed for present operating expenses.

But even were he interested in growing a second crop there are certain economic obstacles which inhibit the practice of forestry on private lands, and these must be removed before the timberland owner will engage in

it. These obstacles are the insecurity of the timber crop from fire and the existing system of taxing both land and the growing crop annually. There must be a more effective State-wide protection against fire before the individual owner wishes to put a large investment in cut-over land reforestation. In spite of most efficient fire protective associations of timberland owners caring for virgin timber, the private owner cannot be sure that his land will have perfect protection. There are too many hazards from adjacent lands not now covered by association, State, or Federal patrol—chiefly the private cut-over areas, which are the "no man's land" of fire protection. It then becomes a public function to give each owner security by enforcement of the fire preventive laws and by a radical extension of the public and private co-operative fire protection system which will give reasonable safety to all lands both cut-over and timbered. Tax reform has long been agitated, but slow in coming. It is not the major obstacle to the practice of forestry, but under the present system a long time forest investment could not be very profitable.

The Pacific Northwest is fortunate in having among the leaders in the lumber industry men who are forward-looking, open-minded, and public-spirited. They know the history of other forest regions and appreciate the problem that lies in this Douglas fir region. They are not unconscious of the responsibility that is theirs to prevent the self-annihilation of the lumber industry and the denudation of great areas of potentially productive land. They co-operate well with public agencies and have an open mind for what the forester can tell them. More and more they are realizing that something must be done and are talking about it a good deal, but so far doing little.

The solution of the cut-over land problem which they almost unanimously propose is public ownership. They claim in effect that long term practice of forestry on extensive forest areas such as those in the western mountains is not an enterprise for a lumber company, but that it must be done, and that the public (either Federal or State government) is, therefore, the only agency to do it. It is not that they are shirking their responsibilities in the matter—"passing the buck" to the Government—but rather that as practical men they cannot see over the obstacles which stand in the way of private capital engaging profitably in forestry. Whether these obstacles can be lowered and sentiment changed is the task for the friends of the lumber industry and conservation to find out.

Undoubtedly the hope of the lumberman will in part be accomplished and some cut-over land added to the existing National Forest and thereby put under forest management, but perhaps too late for the best silvicultural results. It is, probably, wise public policy and good economics that there should be a larger area of publicly owned forests in the western mountains than at present. The boundaries of the National Forests should be extended to round out suitable units for administration. This will be accomplished if Congress listens to the demands of the local public, by exchanges of land for stumpage



THE RESULT OF "TIMBER MINING" IN THE DOUGLAS FIR REGION, WHERE NO EFFORT IS MADE TO SECURE A NEW CROP
On such areas repeated fires, together with the absence of seed trees, mean that the land will remain permanently barren and unproductive.

and perhaps by direct purchase. The States are now in process of consolidating their present holdings into blocks, which, it is sincerely hoped and expected, will be managed for sustained yield. It is likely, though as yet not proposed, that there will be an enlargement of the areas of State forests to supplement the Federal forests.

But the solution of the forest problem of the Douglas fir region is not wholly the acquisition by the public of cut-over land. It is not desirable, I should say, that the public own the entire ultimate forest area; and it is extremely improbable that it will acquire any additional acreage before the process of denudation has been completed. Meanwhile the virgin forest will be stripped off without regard for sustained yield of watersheds, the perpetuation of regional industries or the continued productivity of the cut-over lands. Something has got to be done by the private owners to keep their lands productive. The ultimate forest lands of Oregon and Washington are not going to bear their full measure of another crop unless the timberland owner practices better forestry on his own lands than he is doing now. We might as well take conditions as they are and understand plainly that the solution of the problem does not lie wholly in public ownership, and every effort should be made to encourage the private owner to take the responsibility of caring for his lands according to correct silvicultural principles. No program to this end has been agreed upon. The subject is very much in agitation but rather overshadowed at present in the lumberman's mind by income tax problems, car shortage, and the like. It is well that it is at least in agitation and some day soon it must crystallize into a program of legislation and co-operative action between timberland owners, the State and the Federal Government. Just what this program will be or should be it is premature to say, because sentiment has not been shaken down as yet. But there are certain prerequisites to progress. These may be briefly stated:



AN EXCELLENT STAND OF 10-YEAR-OLD DOUGLAS FIR SEEDLINGS

This is the result of a conscious effort to secure a new crop of timber after logging on the Columbia National Forest, Washington. The area was cut over in 1909, the slash burned immediately thereafter, and effective fire protection given since then.

(a) A public classification of the timbered and cut-over lands of the region to determine what are agricultural and what should be dedicated to permanent forest production.

(b) Tax reform, which will remove the current burden of carrying immature forests.

(c) Stricter enforcement of the present good forest fire laws, so that property may be less subject to the menace of fire from sources outside the control of the owner.

(d) Additional financial appropriation by the States and Federal Government to promote forestry practice, recognizing that it is very much to the public interest, not only of the commonwealth but of the whole nation, that these cut-over lands be kept productive and that without governmental aid they will lie unproductive.

(e) Co-operative assistance from the appropriations proposed above to private owners who agree to manage, according to a certain standard, lands that have been classified as permanent forest ground. This assistance would embrace technical advice, the approval of working plans by a State or Federal forester, and certain phases of actual fire protection and suppression.

Were these five measures taken to remove the obstacles to the practice of forestry and put it on a stable basis profitable to the individual or corporate owner, there is no doubt but that the continued productivity of most of the cut-over lands of the Douglas fir region would be assured. With the enhancement of stumpage values that are sure to obtain before the next crop is cut and with the exceedingly favorable soil and climatic conditions of the Douglas fir region and the unparalleled rapidity of growth and vigor of this tree, forestry should pay here, if anywhere outside of a woodlot region. It will pay the public to adopt such measures, so that the owner will do what he would not do without them; and it will cost the public dearly in generations to come if something is not done and done soon to forestall the rendering unproductive of the immense stretches of mountainous timber lands of the Pacific Northwest.

AIRPLANE PATROL OF THE FORESTS

BY F. A. ELLIOTT, STATE FORESTER OF OREGON

IT may be safely said that the latest development in forestry is the use of airplanes in the patrol of Oregon's timber resources for the detection of forest fires.

Experiments along this line were carried on in Oregon last summer by the Air Service branch of the War Department, working in co-operation with the United States Forest Service and the Oregon State Board of Forestry. Last season's work may be classed as an experiment by the different services to determine the advisability of maintaining such a patrol from year to year. Would airplane patrol prove to be the more economic and effective, eventually replacing the patrol and lookout system now employed for forest fire detection and suppression? These and many other questions were in the minds of the men charged with the protection of Oregon's timber when the planes were first introduced. The Air Service had available planes and personnel at their disposal. These pilots, mechanics and planes must be kept in action, and the Air Service was anxious to determine the possibility of performing a real and valuable service in conjunction with their regulations, which provide that each pilot spend a certain amount of time in the air. The men on airplane patrol in Oregon last season are highly enthusiastic over the experiments and eager to become efficient in this new line of work, while the Forestry officials are extremely optimistic over the possibilities of organizing an efficient patrol system for the coming year.



SALEM AIRPLANE PATROL BASE, SHOWING DE HAVILAND TYPE PLANES

Meetings of representatives from the Air Service, State, Federal and private forest protective organizations are being held and plans formulated for 1920. It is very probable that the War Department will give further assistance next season, and that a system of airplane patrol will cover Oregon, California, Idaho, Montana and Washington. Such a patrol will disregard all State and National Forest boundaries and will conform to the general topography and character of the forest cover throughout the five States. California and Oregon were the only States to receive aid from the War Department in airplane patrol during 1919.

For Oregon alone, one complete observation squadron will be required to sustain a daily patrol of the 28,000,000 acres of timber, brush and cut-over land which constitute a fire risk. This squadron will probably consist of 18 planes, most probably of the DeHaviland type, 180 men, from 30 to 40 officers, carrier pigeon lofts, and will include a photographic and radio section.

Besides maintaining a daily patrol during the fire season, it is planned to photograph the entire forested area. With the special aerial photographic appliances now in use by the Army, it is estimated by Army officials that this work may be accomplished in practically three weeks' time. Should the plan for the combined patrol of the five States be approved by the Air Service, primary control stations will be established at Eugene, Oregon; Camp Lewis, Washington; Mather Field, near Sacramento, California, and one other in Idaho or Montana not yet selected. The Oregon sub-bases will be located at Portland, Salem, Eugene, Roseburg, Medford, Klamath Falls, Prineville, Marshfield and Baker. To accommodate the large DeHaviland ships, the landing fields must be at least 2,000 by 1,000 feet, free from obstructions, such as trees, telephone lines, etc., and located on a level or fairly even slope of sod or firm soil. Several such fields have already been provided through the efforts of local Commercial or Aero Clubs and by public-spirited citizens, and are located at Portland, Salem, Eugene, Roseburg and Medford. The advisability of going to any great expense in providing emergency landing fields along the patrol routes in the mountainous regions is not considered practical by the Air Service officials, since they state that such fields are apparently never located near where trouble occurs.

The mechanical success of the planes is beyond question when the following figures are considered regarding the distance covered by the Oregon patrol in 1919. The

first patrol startd August 2, and continud until August 22, during which time seven Curtis type planes were used—four ships making two two-hour trips each day, flying at an average speed of 60 miles an hour and making a total distance of 20,160 miles during the 21 uninterrupted flying days. August 23 the Curtis planes were replaced by the larger DeHaviland type, as they can remain in the air nearly twice as long. This type was found to be the more efficient and continued the patrol work until October 7, when the fall rains and cool nights made further patrol unnecessary for the season. The DeHaviland planes are American made and contain a 400-horsepower Liberty motor, and are capable of traveling at the rate of 120 miles an hour. Although a more difficult plane to handle than the Curtis type, they have a much greater gas and oil carrying capacity and can safely remain for a period of four hours in the air.

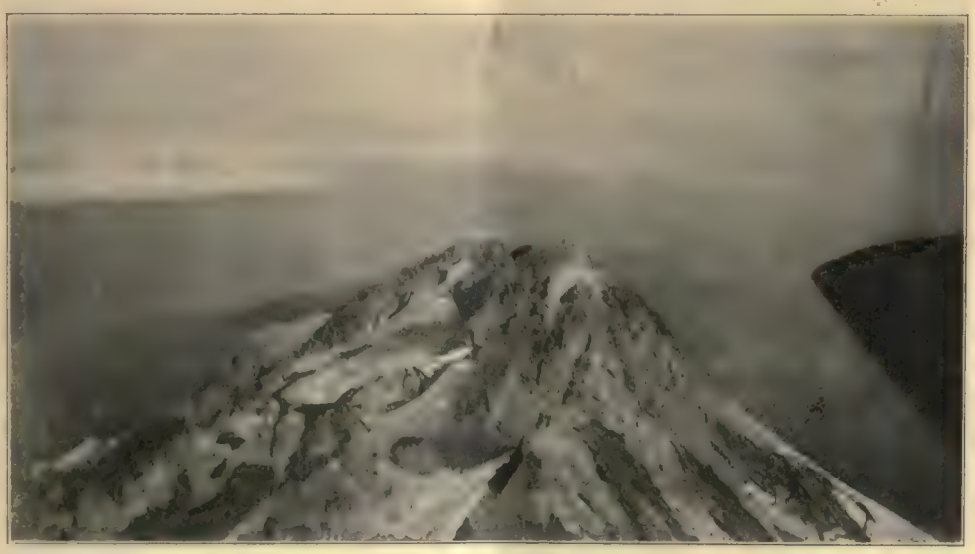


CRATER LAKE FROM THE AIR. IN THE DISTANCE MAY BE SEEN DIAMOND LAKE, MT. THIELSEN, MT. BAILEY AND THE SISTERS

During the 35 actual patrol days by these five new ships—two flying six hours each day at an average speed of 95 miles per hour—they covered a distance of 39,900 miles. The combined distance flown by the Curtis and DeHaviland planes during the 56 patrol days amounted to approximately 60,060 miles, or more than twice the distance around the earth. This distance was traversed with only six forced landings; three due to inclement weather, and resulting in one wrecked plane. The other three were caused by motor trouble, resulting in the loss of one officer and the total loss of one ship. The entire operating expense was borne by the Air Service. The State and Federal Forest Service arranged the plan of patrol and gave the pilots and observers the benefit of their knowledge in fire detection and suppression gained through years of experience. They also provided landing fields, arranged for gasoline and guards for planes at substations, provided transportation for the men to and from the fields, and co-operated with the Air Service in every possible way.

The area of effective visability depends somewhat upon the atmospheric conditions and the altitude of the plane. At a height of 10,000 feet, under fair observation conditions, a very small fire may be easily picked up at a distance of 30 miles.

It is during smoky weather that the airplane patrol is much more advantageous than the lookout system. Neither smoke nor a difference of several thousand feet in altitude hinders the visability as much as one would suspect. With the lookout system there is nearly always a section of the country back of the ridges which cannot be seen; with airplane all regions are equally visible. The airplane is not only effective for locating new fires, but, as the past season demonstrated, is extremely valuable in reporting progress on large fires or in exactly locating a group or series of small scattered ones. Experience has shown that a trained observer, after a reconnaissance from the air, can gain more useful information



AN AVIATOR'S "CLOSE-UP" OF MT. HOOD FROM THE SOUTHEAST. ELEVATION 11,225 FEET

about the character of a large fire than can a man on the ground in a heavily timbered area. Controlled fires can be covered each day to see that they do not break out anew.

At present it is not deemed advisable to reduce the regular patrol and lookout personnel; however, these men may be used more advantageously and, instead of being on patrol duty, may be bunched on improvement and construction work; each working crew to be provided with a telephone set and fire fighting equipment so that upon report of a fire they may proceed without loss of time as an organized fire fighting crew.

The success of this new patrol depends principally upon the accuracy of the observer in locating the fire and the rapidity with which he reports the fire to the district ranger or warden in whose district the fire is located.

The accuracy with which a fire can be located depends upon the experience of the observer and the correctness of the maps with which he is provided. The State Forester has provided complete cover maps of Oregon, showing the timberlands, old burns, brush, cut-over or farm lands and the location of all principal roads, streams, cities and railroads.



A SOUTH VIEW OF MT. HOOD FROM THE AIR

Next season the Air Service officials plan to start the patrol at least one month before the beginning of the fire season in order that the pilots and observers may familiarize themselves with their duties and the country over which they will maintain the patrol. During this instruction period it is planned to photograph the forested regions of the State. These photographs will be assembled in map form and be used in connection with other maps for the location of fires.

The lapse of time between the discovery of a forest fire and the action taken for its suppression is a most decided factor in any fire-fighting plan.

Army planes equipped with wireless telephone sets will overcome this need of rapid communication. The United States Forest Service has been successfully experimenting with wireless telephones on Mount Hood and other lookout points. It is expected that by next season such progress will have been made in the experiments as to make their use practical. However, should it be found impossible to obtain the necessary wireless equipment, message dropping from the planes can be successfully developed.

A panel system of identification will be worked out by which each district ranger headquarters and lookout point will be given an identification mark. A black and white square 30 by 30 feet will be located near the district ranger's headquarters and on all prominent lookout points. A corresponding legend will be indicated on the observer's map, so that he may pick up his exact location within any 20-mile radius and can dive down to within 50 or 100 feet of the ranger's headquarters and drop his plat showing the location of the fire, together with any comments or data regarding its action which would prove useful to the ranger.

Message-dropping cans, with a screw-top lid and to which a three-foot red cloth streamer is attached, are available by the War Department. A clearing of at least an acre may be found near all ranger stations and observers can easily hit this sized target. The noise of the approaching plane will put the ranger on the watch for messages.

The observers may be regular Army men trained for this type of work, or they may be experienced fire fighters employed by the Government or State; or at least such men will be often used in making a reconnaisance of large fires. Pilots and observers will carry food and fire-arms so that they may be provided for in case it becomes necessary to make a forced landing in an uninhabited region.

Carrier pigeons will also be used as a means of communication. Experiments in this line were carried on last year and the Signal Corps has detailed an officer and three men to raise and care for the 48 carriers which are now at Eugene. At least 11 lofts, scattered through the five States, were to be started about January 1, so as to have the homers trained for next year's work. Great care is necessary for the proper care and feeding of these birds. This new line of work is not only extremely interesting, but it is believed that the proper organization of an airplane patrol system will result in the saving of thousands of dollars lost each year through the burning of Oregon's timber. Many new ideas of forest fire detection and suppression may be expected in connection with this new system.

GREAT TEACHER OF FORESTRY RETIRES

BY FILIBERT ROTH

DEAN OF FORESTRY, UNIVERSITY OF MICHIGAN

PROFESSOR B. E. FERNOW, having passed the retiring age, has resigned as Dean of the Forest School of Toronto University with the title of Professor Emeritus. The Nestor of foresters in America has thus relinquished active service. Our masterbuilder in forestry has laid down his pencil and square.

For over forty years Fernow has worked uninterruptedly to bring forestry into our American woods; to further the science of forestry; to develop right legislation with regard to forestry as a basic industry, and last, but not least, to prepare men for a profession whose task is to build up and care for the forests of North America.



DR. BERNARD EDWARD FERNOW

With thorough schooling; with forest training at Hanover-Munden, under the famous Heyer and others; with experience as regular forester, Fernow came to this country in 1876, a young man of fine presence, an athlete, scholar, enthusiast; able to see things clearly and in large lines; able to state the case convincingly and able to pick out the things to do, the things of importance and of real value to the great movement in forestry. During the years 1878-1885, he had charge of 15,000 acres of hardwoods in Pennsylvania, supplying the charcoal-iron works of Cooper-Hewitt Company, and other furnaces. While thus engaged in one of the pioneer efforts in the practice of forestry in the United States he found time to write on forestry for *Birkenbine's Journal of Charcoal Iron Workers.* During the early years of this period, being located in New York, he took an active part in starting the forestry movement in that State, and in 1885 formulated for Senator Lowe the legislation which established the forest reserve in the Adirondacks and the State Forestry Commission, embodying in that legislation also the first forest fire warden organization.

In 1882 he assisted in the forming of the American Forestry Association at Cincinnati and Montreal, and for fifteen years acted as Secretary and Chairman of the Executive Committee of this Association. The Association being short of funds in the earlier years he published, as a private venture, several bulletins on forestry, and from 1885 to 1898 he was editor of the Proceedings of the Forestry Association, and of its journal, under the title *The Forester.* To this task of secretary-chairman-editor he devoted much time and effort, directing the work of the Association along definite, well-planned lines, and thus enabling the Association, in spite of its insignificant numerical and financial strength, and in spite of its composition, in which timber owners and representatives of the wood-using industries were almost lacking, to accomplish most astonishing results. The most notable of these was the greatest piece of forest legislation so far adopted in our country, the law of 1891, authorizing the President of the United States to establish National Forest Reserves.

This great act which led to the creation of our present-day "National Forests," and saved to our people an area of forests greater than the combined forest areas of France, Germany and Austria was primarily due to the work of three men whose names should and will live in the history of our nation: Dr. Fernow, Edward A. Bowers, at one time Assistant Commissioner of the Land Office, and Secretary of the Interior Noble, one of our real statesmen who appreciated the importance of the enterprise and was convinced by the clear and concise statement made by Dr. Fernow as the spokesman of a little group of members of the American Forestry Association.

Dr. Fernow's great work for the nation really began in 1886, when he accepted the position of organizer and director of the forestry work of the government in the Department of Agriculture, a position which he occupied until 1898. At that time lumbering was in its glory; there

was no thought of timber exhaustion; Michigan white pine went clear to Texas; Sargent's "Tenth Census" figures were disputed; anyone considering them seriously was a "denudatic" (harmless maniac) in the parlance of the practical experts. There was no use in asking a timber owner to engage in forestry when all his competitors were exploiting on the basis of "cheap logs," at least cost and with the invariable result of utter forest devastation. All this Fernow saw as clearly as anyone. His keen sense of justice, his love for plain truth and accuracy did not allow him to find fault with the men of the industry; but neither could he compromise the sound principles of forestry. To him forestry never was and never could be lumbering; his knowledge of forestry was too thorough, his ideals too firmly implanted, and his dislike of all bill poster work was instinctive. To a smaller man the task of starting a useful Forestry Division would have seemed hopeless. Not so with Fernow. With a rare grasp of the situation, he started work at once and along six important and useful lines of action: the spread of forestry information among the people; forest legislation by States and nation; gathering reliable information regarding our trees and forests; experiments to determine the technical properties of our principal species of timber; the stimulating of tree planting on the plains, and finally the education of college students in forestry as a science and industry. With unusual powers for work, almost single-handed, and under the most discouraging conditions of money and equipment, he started this great work.

His first act (1887) was the introduction of the "Hale" bill, providing for National Forest Reserves and their administration; this effort was followed up until it succeeded in 1891. Since no provision for an administration of the National Forests was made in 1891, more effort was required to provide for such; the "Paddock" bill in the Senate in 1892, and the "McRae" bill in the House in 1894, did not succeed, although the latter passed both Houses and failed to become law by mere accident. It was not until 1897 that a definite administration was provided and thus the National Forests actually established as a working enterprise.

During the twelve years at Washington Fernow kept in close touch with the forestry work in the various states, and there was little of state forest legislation passed during this time in which his opinion was not consulted. In spite of the most meager appropriations he succeeded in making a good start in forest and timber research; he secured the co-operation of many prominent men of science; and the numerous bulletins and circulars, including monographs on White Pine, the Southern Timber Pines; results of tests and studies in Timber Physics, the first complete discussion of the metal railway tie as a possible substitute; studies on timber impregnation, and other subjects, all of immediate value in wood utilization, are evidence today of the painstaking work of the guiding spirit which directed them and edited their results for publication. An appropriation for rain-making, turned over to his division, was promptly refused by Fernow. Instead, a scientific inquiry into existing information with discussions by the heads of the Weather Bureau and other competent authorities was published as "Forest Influences," the first of its kind in this country.

Throughout the twelve years in the Department, he never ceased to write articles and addresses, and to go out to deliver lectures wherever opportunity offered. It was in these years that the larger part of his over 200 articles and addresses, over 20 circulars and over 30 bulletins and reports were prepared or edited. The first series of twelve technical lectures to a body of students was delivered at Massachusetts Agricultural College in 1887; others followed at Nebraska University, Colorado, Wisconsin and California. In 1898 Fernow was called to Cornell to organize the first forestry school in the New World. It was a state school, maintained by regular appropriations by the legislature, and the state provided a school forest of 30,000 acres in the Adirondacks. Here he inaugurated the beginnings of professional education. The school grew rapidly until in 1903 it was discontinued by a veto of the governor, owing to misunderstandings developed in connection, not with the school at all, but with the tract in the Adirondacks. While at Cornell Fernow published his "Economics of Forestry;" delivered a series of lectures at Queen's University, at Kingston, Ontario, which were published in French in book form as "La Forêt," by the Department of Lands of Quebec, and in English by the Department of Lands of Ontario as well as by the University. In addition he started the *Forestry Quarterly,* now the *Journal of Forestry,* the only technical forestry journal in the country.

For four years (1903-1907), after leaving Cornell, Fernow worked as consulting forester; kept several timber cruisers and surveyors going summer and winter; did more forest consulting work than had ever been done by any forester in the United States; examined large properties; carried his work into Cuba, Mexico, the South and the Northeast, and demonstrated, in a way quite surprising to some of his acquaintances, his great versatility, and his capacity in business, which had long secured for him a standing among large business men, such as no forester had ever enjoyed. During these four years he continued the *Quarterly;* delivered two courses of lectures at Yale University, and started the forest school at Pennsylvania State College. In 1907 Dr. Fernow accepted an invitation to Toronto University and organized the first forest school in the Dominion, where his work was well known and where he was received by many personal friends, among these Dr. Saunders, of Ottawa, and Sir Henry Joly de Lotbiniere, of Quebec. From this school he has now resigned, with the title of Professor Emeritus, after twelve years of unquestioned success. During these twelve years he did not confine his work only to teaching at the college; he published his well known "History of Forestry," a masterpiece of its kind, covering the subject for both the Old and New World, and also "Care of Trees in Lawn, Street and

Park," a most useful book. In addition he continued the publication of the *Quarterly*, acted as editor for the *Journal*, became a member of the Conservation Commission of Canada, in which capacity he, with his colleagues, White and Howe, conducted some very important field studies, notably the "Forest Survey of Nova Scotia," and the "Survey of the Trent Watershed," both published in book form by the Commission.

Fernow, as few men have ever done, blazed trails in the wilderness; he did his work well, the trails are now traveled by many, the wilderness is opening up. New conditions of supply and demand, of industry and transportation; conditions long foreseen and foretold by the master, are now extending the trails, and expanding them into broad highways, where travel is comfortable and work does not require the self-sacrifice and special abilities of the pioneer; he led the way in forest education of our people and our foresters; he laid plans and began the great task of gathering the information on which forestry in North America must base its work; he secured the first important forest legislation for the nation and directed most of the pioneer legislation in our states; he gave us a forestry journal ranking with the best; he planted in the New World the right ideals without which forestry will never succeed in any country.

To know Fernow, the man, one must have had the privilege of seeing him in his home, on trips in the woods, on water, on the ice, with his family and friends; must have walked with him in the forest; or climbed Mt. Lafayette; have seen him in a company of scientific men, whether mining engineers or entomologists; have heard him among the foresters and economists of the world gathered at the international congress at Brussels; have heard him discuss philosophy with Dr. Ward, and more than all, have seen him seated at his piano, playing, enraptured, far away in another, gentler world.

For having enjoyed this privilege for years, the writer expresses his gratitude to his wise friend and patient teacher.

What Dr. Fernow meant to his students in college is best stated by a few, among the many.

Walter Mulford, Professor of Forestry at the University of California:

To those of us who have had the good fortune to have been long in Dr. Fernow's class room, there is no need to speak of what he did for us there. To the less fortunate ones we can only say that we regret their loss in not coming in contact as students with the strength and the beauty of his leadership. It is the leadership of the first great teacher of forestry in the western hemisphere.

C. R. Pettis, State Forester of New York:

Dr. Fernow not only "blazed the trails" in American forestry, but, through his untiring efforts, he established principles and left forest monuments which make him the foremost American forester. His wonderful knowledge and enthusiasm made him a great teacher; his individual personality is admired by all; his kind helpfulness appreciated by all with whom he came in contact, and his work something that cannot yet be fully measured, but, as time passes, will be found a basis for our silvicultural work.

E. A. Sterling, of James D. Lacey and Company, New York, Timberbrokers:

Each receding year emphasizes the value of the associations made and the relationships established while in college, so, in looking back to the days spent at Cornell in the pursuit of forestry knowledge, under Dr. Fernow, one of the most vivid and treasured memories is the strength of his personality and the value of his guidance and inspiration.

The scholastic things we were supposed to acquire have merged into a broad background of subsequent experience, but the personal associations gained during those years stand out more prominently and assume new importance as time goes on. The problems in forest finance and the involved theory of some old world teacher are long forgotten, but the personality of the man who patiently labored with his students to make them both foresters and men, will never be erased, nor can he wholly appreciate the helpful influence which he exerted.

So to Dr. Fernow, as Dean of the forestry profession in America, as he was Dean of Forestry at Cornell, goes the most heartfelt appreciation of his work, both as a teacher and as an educator in the much broader field which has been covered by his activities. Two decades have demonstrated the soundness of his vision in building up the foundation of a forestry profession at a time when it seemed unneeded, and of little practical application, and not only laying the foundations, but in helping rear the structure which gradually rose from it. He has exerted an influence which is appreciated not only by those fortunate enough to have been his students, but by all who think broadly and see clearly.

Philip W. Ayers, Forester of the Society for the Protection of New Hampshire Forests:

To have been a student under Dr. Fernow is a lifelong inspiration. Not only the breadth of his scholarship in forestry, but also his enthusiastic devotion to the subject, his belief in it, his sense of its usefulness, were all impressive. To each of us personally he was kindness itself; the hospitality of Dr. and Mrs. Fernow can never be forgotten. To both my earnest, best wishes.

Raphael Zon, U. S. Forest Service, Chief, Forest Investigations:

The appointment of B. E. Fernow as Professor Emeritus at the University of Toronto, and his retirement from active teaching, marks not merely a change in his private life but also an epoch in the development of forestry in North America. While the period which Dr. Fernow typifies is rapidly becoming history, his teachings and his contributions have the quality of permanence. They have been always a source of inspiration and guidance to the pioneers of forestry; they will be infinitely more so to the actual managers of our forest lands as soon as real woods forestry comes into general practice. As with any great teacher, it is not the kind of theory that he happens to advocate that really counts, but the ability to teach how to think in his particular field. Theories come and go, but the ability to orient oneself in the details of complex problems is a lasting asset; he who teaches to meet ever-changing problems, not by a ready-made theory or hypothesis, but by a critical attitude and ability to discern between the essential and non-essential, is building on a solid foundation.

As a student under Dr. Fernow, I am personally indebted to him for whatever mental equipment in forestry

I possess, and particularly for my attitude toward the forestry movement as a whole. I consider it an exceptionally good fortune which permitted me to sit at the feet of so great a teacher, with whom forestry was not merely theory but a movement ever changing as life itself, and for whom problems became soluble not in ready-made formulas, but in the forces, economic and natural, that are at work.

Clyde Leavitt, Forester to the Commission of Conservation of Canada:

While Dr. Fernow's invaluable services as the pioneer of technical forestry in the United States are becoming increasingly recognized, there is as yet but inadequate public recognition of the similar part he has played in Canada. It was through his course of lectures at Kingston, Ontario, while he was still connected with Cornell University, that a really wide public interest in forestry first began to be aroused, resulting later in the establishment of forest schools and leading up to the employment of trained foresters by public and private agencies. In his remarkably active work in the field of forestry in Canada, Dr. Fernow has rendered notable public service as Dean of the Faculty of Forestry at the University of Toronto, as one of the members of the Commission of Conservation of Canada, as a member and Director of the Canadian Forestry Association, and as one of the progenitors of the Canadian Society of Forest Engineers. So extended have been his activities and so wide his influence that he may in all truth be termed the father of technical forestry in Canada, as well as in the United States.

ANÆSTHETICS FOR TREES

SIR Jagadis Chandra Bose gave recently at the India Office some account of his investigations into the secrets of plant life and of the discoveries he has made therein, says the London *Times*.

Sir Jagadis said he had discovered that it was possible to transplant trees without injuring them if the operation were performed while they were subject to the effects of an anæsthetic. A tree so treated shed its leaves after transplanting in the summer instead of in the autumn, but it very soon recovers itself and became normal.

The most intense activity of life was often inperceptible, and it was only by making the unseen visible that the mystery of growth and movements of life would become revealed. He showed that by the crescograph the highest powers of the miscroscope were magnified 10,000 times. No experimental conditions for exhibition of growth could have been more difficult than in the depth of English winter, when plants were in their period of hibernation. In spite of this they were made to shake off their torpor, and the rate of growth was exhibited by the indicating spot of light rushing across a ten-foot scale in the course of twelve seconds, the actual rate being about a hundred-thousandth part of an inch per second. With the crescograph to guide him, the life-activity of the plant became subservient to the will of the experimenter.

A depressing chemical agent was applied and the march of life was slowed down; a timely application of a suitable stimulant revived the dying plant and exalted the growth-activity to many times the normal rate. The possibility of modifying the rate of growth was a matter of great practical importance, for the world's supply of food depended on the growth of plants. The rule-of-thumb method hitherto employed in the application of a few chemical stimulants and of electrictiy had not been found uniformly successful. Researches by means of the crescograph showed that a very important factor was the dose of application, any excess above the critical point bringing about a result diametrically opposite to what was expected. Thus while a particular intensity of electrical current accelerated growth an excess of current retarded it. The same was true of chemical stimulants.

GREAT BRITAIN'S FORESTRY COMMISSION

IN a letter to the editor of AMERICAN FORESTRY Magazine, Colonel John Sutherland, of the Forestry Commission at Edinburgh, says: "We have now had the Forestry Commission established in Britain, consisting of Lord Lovat, chairman; Right Hon. E. D. Acland, Sir John Stirling-Maxwell, Col. W. Steuart Fothringham, Lord Clinton, Mr. L. Forestier-Walker, Mr. T. B. Ponsonby and Mr. R. L. Robinson. We are now engaged in preparing afforestation schemes and hope that by April we may have some acres planted, but we cannot achieve nearly as much as we would like in the first year as we have only now really got to work.

"I hope the proposals which are so admirably described in the AMERICAN FORESTRY Magazine for the reafforestment of the United States may take root and that Colonel Graves may receive all the support that is necessary to assure America of a good crop of trees for the future. It seems to me that it is very necessary both for America and for Britain that afforestation should be well established so that a sufficient supply of timber in both countries will be available within the next fifty years.

"It is very desirable that we should keep in touch with your work in America, and I will be glad, if you desire it, from time to time to let you know what we are doing at home.

"I retain many pleasant recollections of my association with the Forestry Engineers in France, and will always remember the excellent co-operation and assistance which was rendered to us by Colonel Graves, Colonel Greeley, Colonel Woolsey, Major Bruce and many others who were associated with us in procuring timber for the armies. Major Frederick S. Kellogg was the Officer in Charge of the First Company of Engineers which were lent to the British Directorate of Forestry, and to him and his staff we were indebted for the formation of an excellent operation in Les Landes.

"If you are in touch with any of these officers, I will be glad if you will convey to them my best wishes for 1920."

THE HISTORIC TREES OF MASSACHUSETTS

IT IS claimed that Massachusetts has a greater number of historic or otherwise famous trees than any State in the Union, and this claim is strongly supported in a very beautiful book just from the press of Marshall Jones & Company, of Boston. It is called, "The Historic Trees of Massachusetts," and was written by James Raymond Simmons, of Syracuse, New York, Secretary of the New York State Forestry Association. Mr. Simmons, who was formerly Assistant State Forester of Massachusetts, writes with enthusiastic interest in his subject, and he has made a point of historical accuracy in his presentation.

A tree to be of historic value must be closely connected with men or events, and the very human sketches of the lives of these justly famous trees will hold the interest and attention of tree lovers from the beginning to the end of the book. "Speaking from the standpoint of trees as individuals," says the author, "we find that certain of them are identified with events of nation-wide and even world-wide importance. An historic tree commands in us the same quality of admiration which we feel for a great mind; it has been associated with the noted characters of its time; it is related to events whose results have affected the life and development of the community; it has demonstrated its ability to stand like a conqueror in the face of storm and adversity and has arisen superior to opposing forces of every description. We, therefore, honor its excellence and cherish its memory with that of our heroes!"

The book is beautifully illustrated, the photographs having been taken by the author—intimate studies of trees he loved.

Through the courtesy of Mr. Simmons and his publishers, AMERICAN FORESTRY is privileged to reproduce here excerpts from the book and illustrations. All of these trees have been entered in the American Forestry Association's Hall of Fame for Trees.

AT the right is shown the entrance to the beautiful stand of white pine at Abington, which has come to be known locally as Island Grove, but more generally as Abolition Grove, and is often pointed out to the stranger as "the place where the Civil War began." Here, in the open air, sheltered only by the whispering pines, great men, and women, too, stood and delivered speeches in the cause of abolition. Webster, "a man who loved mountains, and great trees, wide horizons, the ocean, the western plains, and the great monuments of literature and art," spoke in this historic place. Garrison was heard by the worthy people of Abington and the surrounding towns beneath these same white pines. The full list of those who spoke here includes some of the greatest minds of the Civil War period. A huge boulder within the grove marks the spot where the orators were wont to stand when speaking.



THE BLACK WALNUT, WEST MEDFORD

THE Black Walnut at West Medford is famed for its size and symmetry as well as its connection with local history. It is fourteen and a half feet in circumference, eighty feet in height and seventy-five feet in spread.



THE ENTRANCE TO ISLAND GROVE



THE WASHINGTON ELM AT CAMBRIDGE

THERE is probably no tree dearer to the hearts of the people of Massachusetts, or even of the country at large, than the Washington Elm at Cambridge. Travelers from every leading nation of the world have looked with reverence upon this spreading elm, and pondered long as they read the inscription on the monument at its base. Artists have painted it, poets have sung its praises, and most historians who have written of the Revolution remind us that "under its branches Washington took command of the Continental Army on the 3rd of July, 1775." More than a hundred and forty years have come and gone since that important and imposing event took place, and the Washington Elm still stands! Sorrowfully—now but a shadow of its former self.



THE LINDENS AT PLYMOUTH

NOW on Boston Common there has arisen on the site of the Great Elm, and from its roots, a sprout generally known as "the old elm's descendant." It is now a lusty tree 6½ feet in circumference, and is surrounded by an iron enclosure. Bonner's map of 1722—earliest record of famous trees of the Common, gives the location of the Great Elm—true native and king of the Common, which fell victim to a gale in 1876.



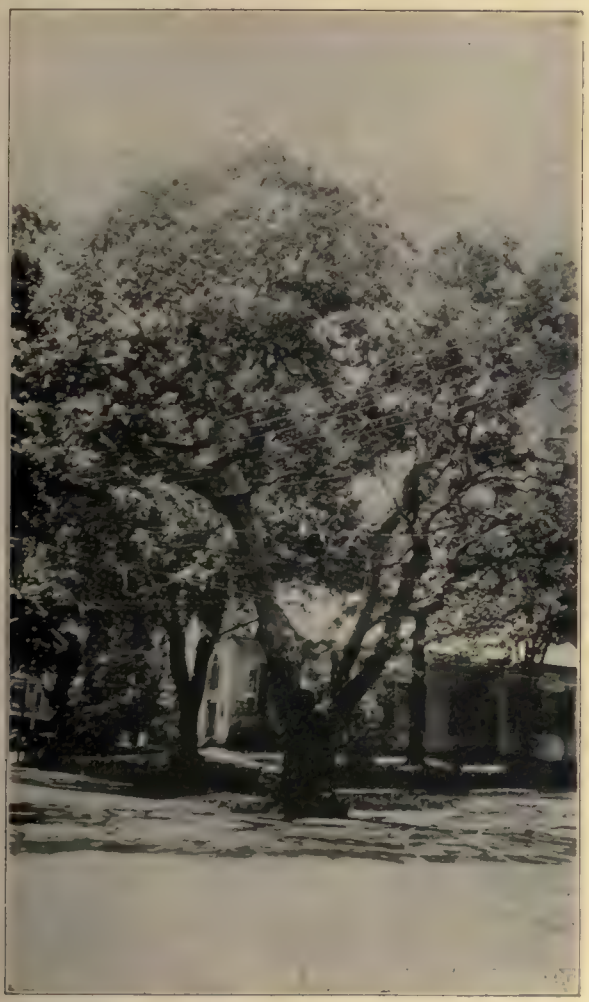
THE OLD ELM'S DESCENDANT

AND the lindens of Plymouth town! What manner of trees were those which tossed their giant branches against the stormy sky as the Pilgrims landed? Not the lindens, for while these grew beautifully in the Mother country, they had to be planted here. Certainly the planting of such trees in the New World was a mark of affection for things held dear in the Old, and the symbol of a friendship which even the misunderstandings of Revolutionary times could not shatter. America abounds with oaks, lindens and elms thus planted.

THE Roby Elm, so named from Parson Roby, who planted it, about the year 1770, stands on Main Street in the town of Saugus. Its circumference is 15 feet 2 inches, spread 100 feet and height 75 feet. The trunk is of unusual length, being about 30 feet, and numerous large branches sweep upwards for at least twenty feet more before spreading to form the crown. It is related that the parson selected and dug this tree with great care, placing it in his house, still a fine old residence and one of the landmarks of Saugus, where he kept it until the following morning and planted it in a suitable spot in his yard.



THE ROBY ELM



THE ELIOT OAK

THE summer tourist on his way to Cape Cod has often passed through the portion of Hingham lying just to the south of Nantasket Junction near the Cohasset town line. He has noticed, on the right hand side of the road a very large and symmetrical tree, known as the Cushing Elm. The name of Cushing has been justly bestowed upon the "ancestral elm." The family came from Hingham in old England and settled in Hingham in New England as early as 1638. Measured in the summer of 1916, the spread of the branches is over 100 feet and the circumference of the trunk 16½ feet four and a half feet from the ground.

JOHN ELIOT, justly styled Apostle to the Indians, and founder of Natick, first gathered the red men together, about 1632, "from their scattered kind of life into civil society" within the shades of the forest, and preached to them beneath a white oak, now a mighty tree, universally known as the Eliot Oak.



THE CUSHING ELM



THE LAKEVILLE ELMS

NEAR Middleboro, on the road to New Bedford, there are standing at the present time two beautiful and towering "wine glass" elms. As you approach them from the north they give the impression of being so close together that the tips of the branches interlock, but they soon break upon the view as two separate columns, seventy-five feet apart, lifting their heads upward into the sky. Each is slender and graceful, not possessed of great age, but singularly beautiful in its isolation from everything save field and sky and distant woods. The larger tree of the two has a height of 60 feet, a spread of 65 feet and a circumference at breast height of 8½ feet. The smaller is 60 feet in height, 50 feet in spread and 7 feet in circumference. Their historic value lies in their location in a one-time training field of Civil War times. They are known as the Lakeville Elms.



THE AVERY OAK

THE oldest white oak in Dedham bears the distinction of having once been selected as suitable material for the celebrated and much honored frigate that still lies at anchor off Charlestown—*Old Ironsides*. The amount offered was seventy dollars, but the offer was refused because the owner's wife, Mrs. William Avery, greatly admired the tree and prevailed upon her husband to spare it. This was about 1798, and the Avery oak is still with us, gnarled but vigorous. The present circumference at one foot above the ground is 23 feet 5 inches, and at breast height 16 feet 9 inches. The height is 68 feet and the spread of the branches 93 feet.



THE HOLLISTON ELMS

THE elms at Holliston were planted about the year 1747. They may have been six or seven feet in circumference during Washington's time, but they seem to have escaped the attention of those who would have given them a place in literature. The larger of the two trees is quite as remarkable in its way as the smaller and is certainly more magnificent. Unquestionably no pair of elms in Massachusetts can surpass these in size and grandeur; none give greater hope of preserving their beauty far into the future. For the larger tree the circumference at breast height is 18½ feet, the height is 92 feet and the spread 80 feet. For the smaller, the circumference is 16½ feet, the height 85 feet and the spread 85 feet.

THESE magnificent old elms in Lincoln stand directly in front of the oldest house in the town and about seventy-five yards from the State road leading from Concord to Boston, approximately two miles east from Concord. They are about 15 feet in circumference, and are beginning to decline. The branches have a highly muscular appearance but have suffered somewhat from insect pests.



THE PAIR OF ELMS AT LINCOLN

THE Boxford Elm, standing in front of the old house erected by Asa Perley in 1760, both house and tree have since remained as cherished landmarks of Boxford, as well as of Essex County. The elm gradually developed into a great tree—one of the greatest in Massachusetts. It has at the present time a circumference at breast height of 14 feet 4½ inches, a height of 70 feet and a spread of 100 feet. At about ten or twelve feet from the ground the trunk divides into five large branches which in turn subdivide to form a broad crown, overtopping the old Colonial residence, and lending its charm to the whole country-side.



THE BOXFORD ELM

WHEN selecting a young tree for planting as a permanent, living monument, capable of occupying a given spot for from one hundred to five hundred years, one would hardly choose a fruit tree. And yet John Endicott, the earliest pioneer of the Massachusetts settlement under the patent, has left behind him a pear tree which he planted about the year 1632, and which still "bears more fruit than the whole town can eat" as the people say in Danvers. Measurements have no value and convey no meaning, as applied to this tree. Soil has gradually collected about the trunk until the two main branches appear to rise from the ground as separate trees. They evidently join under a heavy covering of sod. Surrounding them is a fence which acts as an effective protection. When the author photographed the tree it was covered with green fruit.



THE ENDICOTT PEAR TREE



THE CHEEVER WALNUT

AS a matter of passing interest it may be said that in the old town of Saugus there is a beautiful specimen of the black walnut, an older tree, supposedly, than the Roby Elm, concerning which the author of "Our Trees" (of Essex County) says, "It is quite among the possibilities that Cotton Mather could have stopped to rest beneath the shade of the 'Cheever Walnut' on his way on horseback from Boston, to witness witchcraft executions on Gallows Hill in Salem in 1692." It stands on Center Street and measures 13½ feet in circumference, 67 feet in height, and 87 feet in the spread of its branches.



THE MONROE TAVERN ELM

IN some respects these elms of South Chelmsford are more beautiful *as a group* than even the Hollinston elms, while the latter have that peculiar interest and charm that arise from great age. The South Chelmsford elms are on the W. R. Winning farm, not far from Carlisle Station. Each is 14 feet in circumference, and the combined spread of the branches is 125 feet. They are always conspicuous for the number of birds that nest in their branches, chiefly orioles and vireos.



THE PAIR OF ELMS AT SOUTH CHELMSFORD

DIRECTLY in front of the "Old Monroe Tavern" may be seen this beautiful elm. Here, on the day of the battle of Lexington, horses were tied to a series of iron spikes, driven at intervals of several inches, around the tree. One of these, over which the bark has not yet closed, may still be seen about an inch and a half below the surface. This spike is exactly four and a half feet from the ground. The circumference of the tree at this point is fourteen feet and five inches.

ON the bank of the Concord River, just beyond the Monument Street bridge, and not far from the famous "monument of the minute-man," there is a very old willow tree. Its girth is greater than that of any tree in Concord, and it is known to have been a sizeable specimen even in Revolutionary times. The circumference at breast height, measured from the upper side, is twenty-two feet; from the lower side, it is eighteen feet and eight inches; the height is forty-three feet and the spread sixty-three feet. At the point where the branches emerge from the trunk the circumference is nearly thirty feet.



THE OLD WILLOW AT CONCORD



THE MARLBORO ELM

AMONG the trees in historic Concord, belonging to a later time and associated with the years of peace and accomplishment rather than with those of war, are the two old elms in front of the Louisa May Alcott house, and the little grove of pines and spruces just beyond it. Under the shade of the elms once lived the author of "Little Women" and among the whispering pines Hawthorne walked, thought and wrote, or coversed with his friend, Thoreau. The elm at the left of the door as the visitor approaches the old house is thirteen feet in circumference, and the one at the right is fifteen feet. Their height is about sixty-five feet. The spread of the branches is not imposing, as one of the trees has lost nearly half of its limbs.

THE road over which Washington passed on his way to Cambridge is still in the favorite highway between Springfield and Worcester. It has now become the popular automobile route between those cities, and many a beautiful tree greets the traveler with its grateful shade. After passing the old oaks at Wayside Inn, going toward the west, you enter the town of Marlboro. Near the end of West Main Street, on the lawn of the Stevens place, stands an old elm tree, the dimensions of which are quite extraordinary: circumference at breast height, 17½ feet; height 74½ feet, spread of branches, 100 feet. The roots on the southerly side rise from the ground like an abutment, increasing the circumference at one foot from the ground to 29½ feet.



THE LOUISA MAY ALCOTT ELMS AND HAWTHORNE'S GROVE



THE GRAFTON OAK

WHILE the patriots in Boston were rallying beneath the branches of the Liberty Tree and the Great Elm, events of a similar nature were taking place in one of the small towns in the center of the State. Not far from the town square in Grafton stands a very fine red oak, bearing an inscription on a copper tablet. It has witnessed some stirring scenes in its day, among which may be mentioned the departure of troops for the battles of Concord and Lexington in the war for Independence. This old oak is 14 feet 5 inches in circumference, 62 feet in height, and 75 feet in the spread of its branches.

BEYOND the town of Palmer, a quarter of a mile from the railroad bridge, and near the center of a broad curve of the main road to Springfield, is a wide-spreading elm of the oak-tree type, comparatively strong and most pleasing in its proportions. Beneath this tree Washington rested and refreshed himself, and delivered a short address only three days previous to taking command of the army at Cambridge. The elm took its name from the tradition, apparently well attested, that General Washington, accompanied by his Staff, General Lee and the deputation sent from Cambridge to Springfield to meet and escort him to headquarters, halted with his party under the shade of this tree to rest and lunch about noon, June 30, 1775. Very naturally the party ordered milk and *other necessaries* from Captain Graves' tavern. Like many trees of its kind, this elm has developed greatly at the base. At one foot from the ground the circumference is nineteen feet, while at breast height it diminishes to fourteen feet and one inch, increasing again as the branches are approached. The height is fifty-five feet, and the spread of branches ninety-five feet.



THE SPRINGFIELD ELM



THE WASHINGTON ELM AT PALMER

THIS is the last survivor of a little group that stood in Springfield Court Square in the days of Washington, near the Old Tavern, "allowing the old yellow-bodied stage just room enough to swing around to the front door in fine style!" General Washington rendered the elms historic by his visit there when on his way between New York and Cambridge, and he rendered one more famous than the others, *i. e.*, the elm that stood directly in front of the tavern door, for here it was that he sat and "drank his flip." The city may well be proud to call the survivor of the group the Springfield Elm. Its dimensions are surprising and gratifying—height 102 feet, spread 112 feet, circumference at breast height 19 feet, 9 inches.

OLIVER WENDELL HOLMES included the elm at Sheffield among those of greatest size, beauty and symmetry of form. Doubtless the Sheffield elm was so classified on account of its great beauty and spread of branches, for it fails to show twenty feet of clear girth at five feet from the ground, even at the present time. It has always been considered as one of the most beautiful elms in Massachusetts, and though old age has at last crept upon it, the individuality in the arrangement of its numerous branches continues to produce a strong, graceful and pleasing appearance. In 1916 it measured 3 feet from the ground, 20 feet and 3 inches in circumference, and at six feet 19 feet and 7 inches. The spread westward was fifty-four feet and the height eighty-two feet. Tradition has it that the old elm was standing when the town was settled, in 1725.



THE SHEFFIELD ELM



THE DEERFIELD BUTTONWOOD

AMONG those few trees which may be called elms of the first class is the Lafayette Elm. This tree is situated southwest of the village of Ware, on the road to Palmer, and is 20 feet 7 inches in circumference, 75 feet in height and 100 feet in the spread of its branches. The enormous trunk divides at about ten feet into three branches, the largest of which subdivides into four more. The smallest of the four is fifteen inches in diameter. In general appearance the tree is slightly over-developed on the east side, one great limb stretching in this direction for more than sixty-five feet. Tradition says that during Revolutionary times, Lafayette rested underneath this tree while on his way to meet Washington, and at a later date the elm was named for the famous Frenchman.

IT is difficult to select a single tree from among the many beautiful ones in historic old Deerfield, but the buttonwood in front of the academy is at least representative. It is now eighteen feet in circumference and one hundred feet in height and spread. It stands within the bounds of what was once the enclosure of the fort which was built in 1689. If size is any test of a tree's age, this buttonwood was standing at the time of the Indian wars, for its circumference is larger than that of the Charlemont buttonwood by about two feet. Many thrilling events took place within a radius of fifty yards from the spot occupied by the tree.



THE LAFAYETTE ELM



"THE ELM BY THE LITTLE BROWN HOUSE"

SINCE the great "Willard Elm" is no more, the elm on the Albany Road competes for honors as Deerfield's most famous tree. It is worthy of note that the Indians usually led their captives past this tree to a ford in the river, and thence to the Mohawk trail. The tree is known as "the elm by the little brown house." Thickly growing bushes and vines conceal its huge abutments, which stretch out on each side of the tree to a distance of seven feet. In girth this tree qualifies as an elm of the first class, being 20 feet in circumference, 82 feet in height and 100 feet in spread. With the exception of a few dead branches the tree appears to be in good health.

THE Harrington Elm stands in front of the L. A. Austin place on Massachusetts Avenue, East Lexington. A legend upon its trunk informs us that *"This tree was planted in 1732 by Jonathan Harrington, father of the last survivor of the Battle of Lexington."* It is 70 feet in height, 16 feet 4 inches in circumference and 90 feet in spread. At about ten feet the trunk divides into four great limbs. One of these, on the northerly side, divides again into four branches. There were originally five sub-divisions to the trunk but one fell in a heavy gale. The wound has been treated and is properly healing.



THE HARRINGTON ELM



THE CHARLEMONT BUTTONWOOD

ONE of the most picturesque spots on the "Mohawk Trail" may be found in the westerly portion of the little town of Charlemont, just beyond the old covered bridge which crosses the Deerfield River. At this point a buttonwood tree stands on the side of the slope a few feet above the road, and leans slightly forward as if to protect a spring of sparkling water near its base. Not far away, on the hill above, the first pioneer settler of the township perished at the hands of the Indians. Much bloody warfare surrounded the settlement of this part of the country, to all of which the old buttonwood was a silent witness, and it stands today the most fitting memorial to those frontier heroes—a living monument. Its topmost branches reach to a greater height than the graves on the hill, for the tree is ninety-eight feet high. Beneath the branches, which spread themselves over eighty-five feet of space, passes the "trail;" and near the massive trunk, sixteen feet in circumference, still bubbles the crystal spring water.

SUNDERLAND possesses a gigantic "Old Buttonwood," the largest, doubtless, in Massachusetts. The giant limbs, stretching upward for a hundred feet, more or less basket-shaped, and spreading to an equal distance, are plainly visible from Sugar Loaf Mountain, and from several points along the highway leading north. Their characteristic color stands out conspicuously against the green background of other trees. More marked than any other particular feature is the ponderous trunk. It reminds one of an elephant. The girth at breast height is 20 feet 6 inches, and it is very nearly uniform to the dividing point, which comes at about fifteen feet. Historically, the tree ranks with those of Deerfield, although no battles are actually known to have taken place in its immediate vicinity.



THE SUNDERLAND BUTTONWOOD



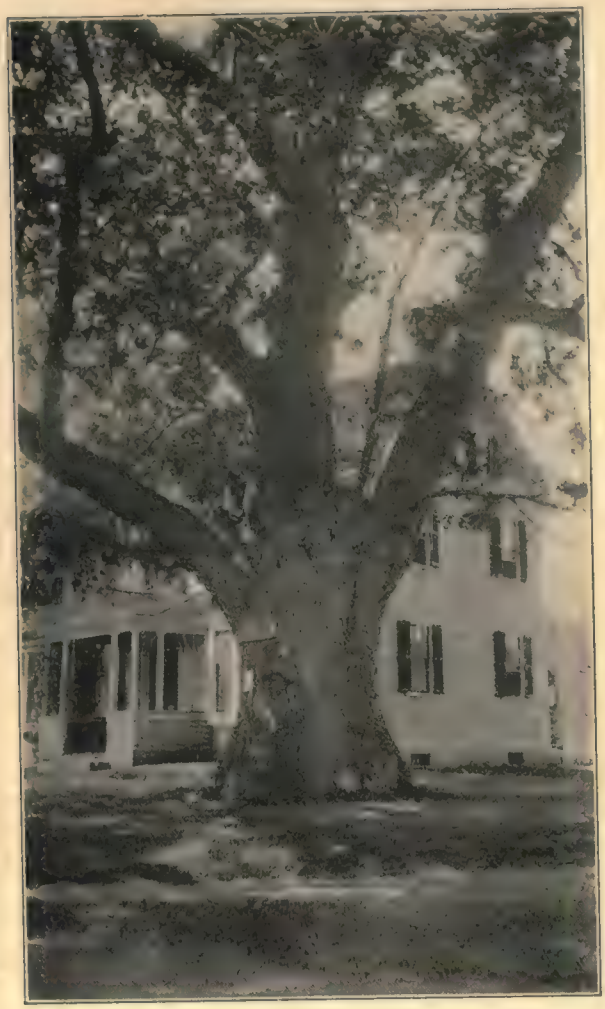
THE OLIVER WENDELL HOLMES PINE

TRULY the author quotes: "The trees of Boston Common are historic trees because the Common itself is historic." The earliest record of famous trees within the bounds of the Common is Bonner's map of 1722, which gives the location of the Great Elm and of a group of elms at the corner of what are now Washington and Essex Streets. One of these was the famous Liberty Tree. The scene has been a constantly changing one through the years that have followed since this early map of Boston was made, for practically every tree now standing on the "peninsula" was placed there by the hand of man. The Liberty Tree was destroyed by the British in 1775, while the Great Elm, the true native and king of the Common, survived until 1876, when it fell in a gale. Memorials now mark the passing of many trees of individual historic fame on Boston Common—trees which will, however, live forever in the documents which shape the earliest history of our country. Surpassingly beautiful are the trees of the Common today, but there are few now standing on this historic ground more than one hundred years old.

AS you walk along the old road to Lenox, you will mark in a wide sweep of lawn the lone and superb pine so much loved by Oliver Wendell Holmes. This historic pine, one of the favorite trees of a noted personage, is an excellent representative of our great New England conifer. You measure its trunk and find that it is 16 feet 4 inches in girth. You wonder at the great depth of its shadow and find that the spread of its branches is nearly 90 feet; and you look upward to its topmost branch and find, if you have a measuring instrument, that it is 97 feet from the ground. There may be a larger white pine than this *somewhere* in Massachusetts, but—where?



BOSTON COMMON IN WINTER



THE BEAMAN OAK

WHILE the famous Cunningham Maple and the Carter Oak are both in advanced stages of decay, and appear "like veteran warriors, beaten down in battle, bearing up their banners to the last," the Beaman Oak remains in all the glory of its strength, and is claimed to be the largest red oak in Massachusetts. It marks the place where Gamaliel Beaman, an early settler, built his house in 1659. The measurements are as follows: Circumference at the ground, 29 feet; at breast height, 20 feet; at five feet from the ground, 19 feet 9 inches; height, 75 feet; spread of branches, 90 feet.

THE only tree in Massachusetts which, at maturity, has ever approached the Rugg Elm in the grandeur of its spreading branches is the elm which stands on the Knowlton farm in West Acton. This superb-elm lost over half of its branches about three years ago, when they fell of their own weight in a very ordinary gale. Timely assistance would have preserved this tree for more than a generation. It has long been credited with possessing the greatest spread of any elm in this section of the country, and the remaining half section covers fully a hundred feet of ground. The largest limb, which was shorn off and still lies where it fell, is 11 feet and 4 inches in circumference. It would seem as if strength had been sacrificed for beauty, and as if a noble head had at last fallen from shoulders too weak to support it. The trunk is fourteen feet, eight and a half inches in circumference and thoroughly sound. The height of the tree is sixty-seven feet.



THE RUGG ELM



THE ELM AT WEST ACTON

THE Rugg Elm (also known as the Gates Elm) at Framingham, situated about two hundred yards from the turnpike road, between Framingham and Fayville near the grounds of the Country Club, is without doubt the largest elm to be found anywhere in New England. The circumference at one foot from the ground is 28½ feet, and at about three feet from the ground the trunk divides into two parts, one of which, at breast height, is 17 feet and the other 14 feet in circumference. Between these two trunks there is a peculiar woody formation, or "nubbin" which may at one time have been the beginning of a third section. The two gigantic trunks sub-divide at about eight feet into three large branches each, and in combination, form one of the most remarkable crowns that can be conceived of. The spread of the branches is 145 feet and the height of the tree is 70 feet. The age of the Rugg Elm is variously estimated at from 300 to 400 years.

AMONG the towns in eastern Middlesex, just north of Boston, notably Medford and Winchester, there are many beautiful trees of all kinds. One of the most remarkable specimens is the elm near the railroad station in Winchester. The Winchester Elm is not among the largest of our famous trees, being only ten and a half feet in circumference, but no more beautiful tree may be found in this section. It has adapted itself to the conditions of our modern city streets and flourishes in the very center of one of the main thoroughfares of Winchester.



THE WINCHESTER ELM



THE HUBBARD ELM

RETRACING our steps from Berkshire to the sea, the last of the famous trees is also one of the most magnificent in the whole collection. Behold an apple tree having the sinews of an oak, the spread of an elm and a crown surpassing both in the beauty of its leaves and blossoms! Imagine it in full bloom, its blossoms nearly the size of wild roses, its largest limbs nearly six feet in girth stretching out thirty feet on every side; its trunk ten feet in girth at the smallest part and fourteen and a half feet at the ground. One envies those fortunate residents of Cape Cod who boast that they played under this "umbrella tree" when children and climbed in its branches. It stands on the estate of Mr. Livermore, of Marshfield Hills, and is known to be more than one hundred years old, having been planted by Stephen Sherman, who was a resident of Marshfield for nearly ninety years.

A "SPLENDID old wreck of an elm" at North Andover, known as the Hubbard Elm, is the peer of Essex, and may be considered as a strong contender for the title of the largest elm now standing in Massachusetts. Though hollow, it commands the greatest admiration and wonder, and its mighty abutments stretch out for several feet on all sides, as if inviting the beholder to step thereon and grasp the deep-furrowed bark in a fond embrace! On the ground about the tree lie several of the once powerful limbs in varying stages of decay where they have fallen. The complete picture produces in the observer the keenest of emotions, and he leaves it with regret, knowing that the time will not be long during which he may be permitted to gaze upon so mighty an elm. The circumference is 24 feet 5 inches at breast height, and the tree is 98 feet high. The spread is not over 65 feet, probably a little more than half of what it was before the beautiful, long limbs fell to the ground.



THE APPLE TREE AT MARSHFIELD HILLS

EDITORS CALL BUSINESS INTERESTS

RESPONDING to the call of the American Forestry Association to enlist in the battle for a national forest policy and for better fire protection of the forests the editors of the country are giving columns of space to the campaign. They are treating most generously all the news being sent out by the Association that has to do with trees and by calling the attention of the public to the value of forests and trees they are all aiming at the common need so vital to the industry of the country, namely, a national forest policy. Some of the editorial comment follows:

Buffalo Express: "In a broad sense reforestation should be the national forest policy. For every tree cut down require that two shall be planted—not at some future time, but AT ONCE. There ought not be any need for argument."

Birmingham News: "The American Forestry Association persists in its insistence that every school take up tree planting. Not such tree planting as is expressed annually . . . but such a conservation of forestry as will constrain every youth in the land to plant. What must inevitably spring from that example is the great thing; federal forest conservation on a great scale."

Syracuse Herald: "Wood is one of the chief reasons for the high cost of living and the American Forestry Association calls attention to this with some startling figures. There is scarcely a commodity that is not shipped or handled in a wood container of some sort."

Canton News: "According to the American Forestry Association, the consumption of pulpwood has increased 100 per cent in 20 years while no systematic work has been done to renew the forests. Years are required to grow trees so prompt action is needed."

New York Mail: "The value of the forest fire service is indicated by the fact, as the American Forestry Association points out, fires destroyed timber valued at no less than $40,000,000 and the average loss from forest fires in 1916-1918 was $21,000,000."

Springfield, Ill., Journal: "The American Forestry Association has suggested that the anniversary of Theodore Roosevelt's death be observed by all persons interested in the conservation of the nation's natural resources. If their suggestion is adopted January 6 each year, the country will recall Mr. Roosevelt's service in this cause."

St. Paul Pioneer Press: "What a pity and what an insane fury of recklessness is it that finds us now with three-fourths of our forests gone without provision for their renewal and still not a move on the part of Congress to save the country from utter depletion of its remaining forests upon which directly depends the living of hundreds of thousands and upon which all society leans for necessary articles, including the materials for dwelling houses and furniture! The American Forestry Association is carrying on propaganda . . . to serve as a means of publicity for the larger cause—the replenishment of the forests."

Rochester Democrat and Chronicle: "There is much to commend in the proposition to make the anniversary of the death of Theodore Roosevelt a day to be observed by the nation as a time to emphasize the need of forest conservation. The American Forestry Association should be encouraged in its effort to have this day set apart by law for such purpose."

Florida Times-Union: "The seriousness of the forestry situation in this country is being brought to the attention of the people by the American Forestry Association and there is hope their work will have the effect of awakening a genuine interest in saving and recouping our timber interests."

Salt Lake Tribune: "The American Forestry Association has a message for the business interests of the nation. It is, 'stop throwing the forests of the nation in the waste basket.' Which is another way of arguing against the wanton waste of paper. The pulpwood situation certainly is one which gives force to the plea."

Cleveland Press: "Charles Lathrop Pack, president of the American Forestry Association, declares that because of the drain of war the warning of Theodore Roosevelt as to a woodless age is ten times more important today than when the late President expressed it. 'Our forests are like a bank' is the way Pack puts it, 'for if we expect to draw out we must make deposits.'"

Los Angeles Record: "At the annual meeting of the American Forestry Association a resolution was adopted calling on the schools, women's organizations and public bodies generally to make January 6, the day Theodore Roosevelt died, 'Roosevelt Day' and to observe it with exercises appropriate to the policy of forest conservation."

Meridian, Miss., Dispatch: "If the American people realized the money value of trees to themselves as well as the nation this country would not be in the danger it is of forest denudation."

Tallapoosa, Ga., Jaurnal: "It takes from sixty to a hundred years to grow a large fat log. It takes about fifteen minutes to cut it down. The answer is easy. Unless something is done to preserve the forests of the country it is only a matter of years before we will have practically no lumber, and the annual floods and water flows will testify to the deforestation of the watersheds."

Atlanta Journal: "Ponder the fact that the United States has barely one-fourth of its original forest and that this is being destroyed three times faster than it is being reproduced? The situation is one to challenge every thoughtful American."

Oshkosh Daily Northwestern: "If the United States allows its forests to be permanently destroyed it will face a bitter reckoning. And neither public nor government can plead ignorance of the dangers of our present practice."

Petersburg, Va., Progress: "The mountains and hills denuded of trees mean an economic loss both on account of the effect of such denudation upon rain fall and the loss of timber for building purposes."

Norwich, Conn., Bulletin: "What the outcome will be the future will reveal but it cannot fail to be appreciated that a move in the right direction is being made when the American Forestry Association approves a plan of co-operation on the part of the federal and state governments for the preservation and development of woodlands. Great inroads have been made into the forests of the country."

Rome, Ga., Herald: It is indeed high time to take measures to stimulate forest growth in the United States and take all necessary measures for the protection and conservation of our whole forest system."

Findlay, O., Republican: "A quarter of a century ago wood was plentiful and cheap. Today it is just the reverse in both cases and the time is rapidly approaching when there is going to be little or no wood and the big forests that have produced the supply will be a thing of the past."

TO RALLY TO THE CAUSE OF FORESTRY

Dalton, Ga., Citizen: "America needs a more thorough awakening to the needs of tree planting now to insure sufficient timber in the future. Industries are calling for timber but the areas that formerly furnished the trees have been partially cleared and little thought has been taken for the future."

Providence Bulletin: "Save paper says the AMERICAN FORESTRY Magazine. A cut of 25 per cent in paper would mean six million less tons of freight for railroads to handle."

Indianapolis Star: "In response to senatorial request for information in regard to depletion of the forests, the American Forestry Association has presented figures to show the New England States are no longer self-supporting in a lumber way; the center of the lumber industry is fast moving to the Pacific Coast; the Lake States are now importing lumber to keep alive the wood using industries of that section. It is time all land owners should give heed."

New York Evening Mail: "The enormous economic importance of our forests is shown by the figures given in the latest census report. These figures show that of the round total of 276,000 manufacturing establishments in the country, 52,000, or 19 per cent, are dependent for their continued operation, either wholly or in part, upon the output of raw material from the forests.

"And yet we have no national policy for the conservation and the development of our timber resources. Not only are we cutting down our forests, for the most part with hardly any regard for future needs, but are giving scant attention as a nation to the protection from destruction of the resources that we have not yet succeeded in squandering.

"This carelessness is indicated by the attempt in Congress to reduce to the vanishing point the government appropriation for the forest fire service. This contempt for one of our most valuable natural resources, the basis of industry in which a total of $3,000,000,000 is invested, is incomprehensible. The American Forestry Association, of Washington, deserves hearty commendation for its efforts to rouse Congress and the American people to the importance of a national forestry policy as a fixed feature of our efforts to make the best possible use of our fast-vanishing natural resources."

Birmingham News: "The American Forestry Association calls attention to the fact that the forest fires in this country burn ten times the area of devastated France every year. Using that terrific fact as a text, Charles Lathrop Pack, president of the Association, preaches a powerful sermon on the imperative need for a national forest policy.

"He explains why the penny newspaper and the two-penny newspaper are things of the past. He sees in the gradual depletion of American forestry an actual menace to education. Some of his recent utterances are alarming, and his data, carefully gathered, confirm the opinion rapidly spreading that unless the United States buckles down to forest conservation, not only will newsprint become higher, but agriculture must inevitably suffer.

"But the conservation of timber for newsprint purposes is even less important than the conservation of forestry for the making of homes for human beings to live in."

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

PARIS, FRANCE

By American Graves Registration Service: Lieut. E. R. Bolinder.

ANDALUSIA, ALA.

By Andalusia High School: James Malcomb, Otis Battle, Arthur Perrett, Sidney Blair, Ary Dukes, Columbus Gillis.

BIRMINGHAM, ALA.

By United Daughters of the Confederacy: Lieut. Pilot Meredith Roberts.

SAN FRANCISCO, CALIF.

By Native Sons and Daughters of Golden West: John E. Fitzpatrick, Herman Cassens, Forest E. Stout, R. C. Mehrtens, Oscar Peterson, Harry Mack, Arthur E. Johnson, Lawrence Sweeney, Leon Vander White, William A. Nonnemann, Gustave Nonnemann, Narciseo De Anti, Harold Feldbusch, William Hagedorn, Edward J. Strohmeier, William Griffin, Leonard Husing, Angelo Cincotta, S. Brilliant, Robert Sturdevant, Walter P. Kenney, Victor H. Davis, Fred Nash, George W. White, Alfred J. Murphy, Ray Healey, John Ward, Thomas J. McDermott, Ernest Hartman, Jr., Hugo Oliver, Frank Legnitto, D. A. Dineen, John Murray, Loring C. Schaffer, H. F. Margey, T. J. Brady, Leon Jacquemet, W. Thompson.

FT. MORGAN, COLO.

By New Movement Class, First Presbyterian Sunday School: Alfred James Creighton, Melvin Walter Trewit.

ATLANTA, GA.

By J. Bentley Mulford: Edgar Allen Poe By William F. Williams:. By Will B. Lane: J. G. Holland. By Southern Mountaineer Educational Association: Miss Helen Gray. By Oglethorpe University Woman's Board: Sidney Lanier. By Sacred Heart Altar Society: Dr. Father Ryan. By Writers' Club: Dr. George M. Niles, Mrs. Lucy Lowery Harper. By Druid Mills Patriotic Club: Paul Hamilton Hayne. By Nineteenth Century History Club: H. E. Harman. By Daughters of 1812: Miss Virginia Arnold. By Atlanta Drama League: Granville Barker.

ELLAVILLE, GA.

By Daughters of Confederacy: Ira Binford, Leon Carter.

LAGRANGE, GA.

By United Daughters of the Confederacy: Jesse Atkins, Joel M. Bohannon, McKinley Joe Brock, John H. Cannon, Hoke Frazier, Ferrel L. Hamer, Charles Parks, Amos Payne, Juel Reid, Baxter L. Schaub, Luther Storey, Juel Taylor, Thomas Thomaston, Knox F. Thompson.

MIDDLETON, GA.

By A. M. Pleyte: Mrs. Eugene B. Heard, Miss Lois Perrin.

MILLEDGEVILLE, GA.

By Federated Clubs of Baldwin County: Isaac Newton Maxwell.

QUITMAN, GA.

By Mr. and Mrs. M. F. Simpson: Hiram Treadaway.

ERIE, ILL.

By Woman's Club: Keith Denton, Corp. Warren J. Mahana, Ralph E. Olinger, John E. Smith, Lieut. Raymond F. Pearson.

KEWANEE, ILL.

By Woman's Relief Corps: Hugh McGinnis, Benjamin McDaniels, James Johnson, Carl G. Johnson, Russell R. Brooks, John Schram, Otto Reich, Herbert E. Bailey, John Ray Dixon, Ernest Ouart, Marie Girvin, Charles Van Wassonhove, Carroll H. Radford, Mike Mikenas, Lawrence Lyons, George Clashner, George A. Johnson, Charles J. Sobotta, Guy Turnbull, Louis W. Tesch, Karl Sawisky, Lloyd D. Elliott, John Ramont, Leo G. Leggins, Axel K. Peterson, August S. Sobotta, William Euard, Merwyn Palmer, Bert Tann, William Helpel.

EVANSVILLE, IND.

By Trinity M. E. Church: Lieut. Judson McGrew.

JEFFERSONVILLE, IND.

By Ann Rogers Clark Chapter, D. A. R.; Bethlehem Township, Charlestown Township, Monroe Township, Oregon Township, Owen Township, Silver Creek Township, Union Township, Utica Township, Washington Township, Wood Township, City of Jeffersonville.

KANSAS CITY, KANS.

By Camp Fire Girls of Argentine High School: Camp Fire Organization.

BRYAN, OHIO

By Mr. Andrew Grim: Kenneth K. Grim.

TACONY, PHILADELPHIA, PA.

By Holy Innocents' P. E. Church: William Thompson, William D. Oxley, H. Stuart Lytton, Thomas W. Astbury.

COLUMBIA, TENN.

By Business Woman's Association: George McKissick, Sergt. Thomas A. Mitchell, Sim Watson, Earl Flowers, Ernest Ferris, Lieut. L. O. Carne, Marcus Springer Hay, Culess Dean Christopher, Lester Akin Barnett, William J. B. Harlow, Oscar Frost, Herman Grady Agnew, Dalton (Dock) Brown, Merritt Jones, Flavious J. Morrow, John O. Baxter, Clarence Kilpatrick, Henry Gulley, Lonnie Lee Blackburn, Harry Lanier.

NATURE ADVENTURES IN THE NATION'S CAPITAL

BY DR. R. W. SHUFELDT, C. M. Z. S.

PHOTOGRAPHS BY THE AUTHOR

IT IS remarkable how much pleasure there is to be derived from short outings into the neighboring country surrounding almost any of our large cities, and how much there is to be learned from them. Any one possessing a strong leaning toward what the outdoor world of nature has to offer, may try the experiment in the less frequented parts of the environs of our National Capital—in the timbered and open country of the District of Columbia. One of the best times of the year for such an outing is during spring or early in the summer; although each and all of the seasons have their charm. For a region so well within the more densely populated part of the United States, it is wonderful what an interesting flora and fauna it possesses; and how much of it all we still have with us! When this is said, a distinct reference is made to the vandalism of many who resort to the woods for apparently no other purpose.

Only too often, at the very outstart of the exploration, one is confronted with the most ruthless examples of destructiveness. We see whole beds of trailing arbutus torn up, quantities of bird-foot violets gathered, roots and all, only to be thrown aside almost as soon as taken, and entire limbs of flowering dogwood broken off, generally by the automobilists, who seem to delight in returning to the city displaying to the public these evidences of their mode of studying nature.



THE SECLUDED RETREAT OF THE LATE JOAQUIN MILLER, AN AMERICAN POET, WHO LOVED TO LIVE CLOSE TO NATURE

Fig. 1. His real name was Cincinnatus Heine Miller (born November 10, 1841), he having adopted the pseudonym he did from having written in defense of Joaquin Murietta, a Mexican brigand.

It is even still more harrassing to see, upon one's very entry into the nearby woods, lying upon the ground, some beautiful bird of the spring, which has fallen to the only too certain aim of some thoughtless boy with his vicious air gun, having been doubtless more bent upon testing his marksmanship than to consider the result of his wanton ruthlessness.

But we hasten through this depressing area, and in a very little while we are in a region which, although visited, is not visited nearly so often, nor by so many people. Here we are more likely to discover evidences of the occasional presence of those who love to live close to nature, than to find results of the acts of the despoilers of her charms. Chief among the former are the little huts for spring and summer occupation; they need no description, and the charming life one may lead in such a habitation can readily be conjectured. No one ever loved such a life more than did our typically American poet of the woods, the late, much beloved Joaquin Miller. Although his modest little house now stands close to a roadway where scores of automobiles pass every day, yet the hut and the surroundings are held in the greatest respect; even the rural vandal has apparently said to himself: "Hands off;" the place is sacred.

When we come to consider what a small area of territory the District of Columbia actually includes, it is quite surprising to find how diversified much of its physical character or topography really is. Some parts of it are markedly hilly, the hills often supporting fine growths of timber composed of a great variety of trees. Then there is plenty of low, flat land, marshes, swamps, and rugged ravines, and it is traversed by one big river, the Potomac, into which empty many small creeks and one or two sizable streams. The Anacostia River is another good stream, with interesting country along its banks. What one misses more than anything else, however, are good ponds and lakes; there are very few of these, and so there is considerable lack of opportunity to observe pond life, although it is by no means entirely lacking.

Across from the rocky shores of the Potomac, the land topography is precipitous and studded with great masses of granite rock (Figs. 3 and 4); and specimens of one kind or another are to be collected there that may or may not occur in the District.

With respect to the flora and fauna of the latter, there is a great deal to be met with in either that any nature lover or naturalist will find of more than passing interest. Among the mammals, there are plenty of racoons, opossums, woodchucks, skunks, weasels, various shrews and mice, squirrels, muskrats, mink, and others. As for the

birds, the list is altogether too extensive to enumerate, as practically it is the avifauna of the Middle Atlantic States. Then, among the birds we may always expect to meet with "stragglers" from time to time, either from the North during very cold winters; from the South during unusual seasons, and, finally, certain aquatic species straying up the Potomac.

The District's reptiles and batrachians are also interesting, and more or less numerous; the explorer and student may, and very likely will, meet with various species of snakes, one of which—the copperhead—is venomous; a few lizards, salamanders, and newts; a land tortoise and several turtles, and quite a number of frogs, toads, and hylas. There is likewise a good representative fish fauna in the rivers, creeks, and small ponds (Fig. 5).

While it is not at all likely that any *new species* remain to be described among any of these vertebrate groups, still there is some probability that new insects, or even mollusks and other invertebrates yet remain unknown to science in the District of Columbia; not many, perhaps, but possibly a few. The same may be said for the lower forms of plants, though not with equal certainty.



ONE BEAUTIFUL BIRD LESS—THE VICTIM OF A BOY'S AIR GUN

Fig. 2. This Golden-winged Woodpecker was photographed, without being disturbed, upon the very spot it fell dead. A pitiful sight upon a beautiful day in early spring.

As to flowering plants, the list is by no means a short one, for the writer has photographed upwards of one hundred different species, and still others are looming up on every hand for similar work in the future. The same for trees and shrubs, not to mention other forms of vegetable life, with many fungi and other growths. Comparatively but little is known of the special anatomy and physiology of all these forms, both in the case of animals and plants; but this is quite apart from what the explorer sees in the physical geography of the District and its representative flora and fauna as a whole.

In undertaking an expedition for the purpose of exploring the District—be the time to be occupied one day or one week—the explorer should be properly equipped, in that the object of the outing may be accomplished—barring changes of weather and accidents. If he intends to do field photography, a suitable camera and outfit will be necessary, the best sizes being either a 5 x 7 or larger. Many prefer very small cameras, and depend upon enlargements made from the negatives; and it may be said that in some cases excellent results can thus be obtained. From time to time a trip will be undertaken with but a single object in view, as for example the capture and photography of small fishes, either pond or river forms. Then it will be best to carry a special aquarium in some instances; but nearly all the little fishes of the District bear transportation well in a small can, if the water be cool and constantly changed. This is especially true of the minnows, sunfish, catfish, and others. Any of these may be taken along the banks of the river and streams where they occur, while the Georgetown Canal offers another excellent place to meet with them.

Large specimens, such as big turtles, snakes, and some mammals, are best carried back to base in a strong bag of suitable size, and closed with a draw-string. These specimens will occasionally give a bit of trouble, and may cause some amusement to passengers in street cars, when one is compelled to travel in them. For example, the big snapper shown in Figure 6 was a very powerful creature, its shell being over a foot in length. He was gentle and quiet enough in the field; but almost as soon as we were settled in a street car, the fellow became very uneasy, and soon made frantic efforts to get out of the bag. This attracted the attention of one or two of the passengers, and they became greatly amused at the writer's predicament. However, the snapper was in the right; and later my regrets were genuine when the news came that he had been crushed between the powerful jaws of one of the larger alligators in the tank at the "Zoo," where the specimen had been sent for public exhibition.

In American Forestry the writer has already given many accounts of the wild flowers that occur in the District, and described the pleasure to be derived from their collection and study. But apart from the joy of seeing the first bloodroots and wind flowers in the earliest days of spring, there is probably no plant that will catch the eye and command the attention of the explorer with



THE DISTRICT BANKS OF THE POTOMAC

Fig. 3. This view is just above Chain Bridge and looking up the river. During unusual floods the water covers everything here in sight, save the timbered hills.

greater certainly than the famous Indian pipe or ghost plant, of which an excellent illustration is given in Figure 7. This plant is especially conspicuous when one comes across it on a cloudy day and it has appeared in very dark soil, the latter being so banked as to give the plant a black background, as we see it in the figure. In some parts of the District, Indian pipe is fairly abundant—that is, one may come to a place where some eight or a dozen plants are scattered over an area of twenty square feet; but, again, one may travel through the woods for miles and not see another specimen of it. The same may be said of the false beechdrops and one or two other parasitic plants. Such plants as these are quite difficult to safely carry back to the studio for the purpose of photography; still it may be successfully accomplished if great care is taken with the specimen. One should have along with one's collecting kit a good, big knife or a small trowel with which to take up the entire plant, leaving a generous supply of earth about its roots. Disturb the setting of the plant as little as possible, and consign the entire thing either to a good-sized tin can or to a collecting basket of the proper shape. Very often, everything else being equal, one can secure a far better negative of such a subject in the studio than can be obtained of the plant where it is found; for in the first instance both light and the movement of the air is completely under control. Many hardy plants travel well to the home from the nearby collecting ground simply rolled in a newspaper cone. Perhaps one of the best carriers is the regulation cylindrical botanical carrying case, which likewise has the advantage that many insects, small snakes, toads, and frogs, and so on, may also be taken home in it for study and for photography.

Should flowers be collected for an herbarium only, and the collector has no idea of photographing them, they may be conveniently carried from the field by simply placing them carefully between the leaves of good-sized magazines. Be very sure to see well to it that the chief parts of the flower—its stem, leaves, and other structures—are properly displayed for study when the plant is placed in the folio holder for the herbarium. The process has already been described by the writer in the pages of AMERICAN FORESTRY, a year or more ago.

As to the collecting of such insects as one may secure on



VIRGINIA SHORES OF THE POTOMAC RIVER, IMMEDIATELY BELOW CHAIN BRIDGE

Fig. 4. Opposite this point the District areas are low and very rocky, considerable timber occurring well back from the banks.

such trips, including moths and butterflies, the best way to do is to follow the instructions given in the works of some of our most competent entomologists—and there are a number of them. Perhaps one of the best of these



ONE OF THE PRETTY AND INTERESTING LITTLE MINNOWS TO BE CAUGHT IN THE POTOMAC

Fig. 5. In some localities these little fellows are known as "Killifishes," and are much sought after for bait by fishermen.

is to be found in the last chapter of Dr. L. O. Howard's work entitled "The Insect Book."

Nearly every large city has a naturalist's establishment, where the necessary outfit for collecting and preserving insects may be obtained. Such work is extremely interesting and important, not only for explorers and field naturalists generally, but for all well-informed foresters and experts on trees in general.

Apart from being a naturalist and explorer, it should be the pride of every efficient forester to collect, study, and rear specimens of every insect pest in the region where he is stationed, be this in the District of Columbia or elsewhere; that is to say, such insects or their larvæ as are in any way harmful to the trees of our forests. It is not a bad idea to devote one good-sized room in one's home to this work, wherein should be installed a special library; cases for the collections and specimen exhibits; vivaria for breeding insects, and the rest. A small studio for photographic purposes is a most useful if not necessary adjunct to such an establishment.

It goes without saying that one of the chief groups presented for study and observation—the one that has as great an interest for us as perhaps any other—are the birds of the region explored; and, as represented in the District of Columbia, the number and variety of species occurring during the vernal and autumnal migrations, as well as during the intervening seasons, is sufficiently great to occupy the time of any expert observer for the better part of every day in the week. For years past the economic ornithologists of the various bureaux connected with such work have collected large numbers of the different species of insect-eating birds for the sole purpose of examining the contents of their stomachs, in order to ascertain whether any particular species of insectivorous birds was inimical to man's agricultural or other interests, or the reverse. Many hundreds of our songsters have been sacrificed in that such information might be obtained and made permanent record of for the enlightenment of any one having use for it. It would seem that researches of this order have been carried far enough for all practical purposes; so that, at this time, the explorer may, in any section of the District of Columbia, when listening to the early morning chorus of bird songs in April, in the secluded parts of some piece of woods or other, eliminate the thought from his mind as to what the contents of the stomach of any species may be. Surely one may now listen to and enjoy the rich songs of our wood thrushes, our catbirds, and our many other avian songsters, without the ever-present "commercial" or "man's interest" idea being forever brought to mind.

There is plenty of work left for bird observers in the case of those who make explorations into the wilder parts of the District, aside from what most people regard as rather gruesome researches. The relative number of



A BIG SNAPPING TURTLE CAPTURED BY THE WRITER IN A CREEK CLOSE TO THE DISTRICT LINE

Fig. 6. This is a most dangerous and vicious representative of its tribe, and quite capable of inflicting a very serious bite.

species seen during the migration always furnishes interesting, not to say important, data for record. The increase or decrease of the enemies of birds is always worthy of investigation, as is likewise true of the dates of arrival and departure of the various species during the migrations. Sometimes it will be noted that a cer-



A BEAUTIFUL GROUP OF THE "GHOST PLANTS" OR INDIAN PIPE FOUND IN VARIOUS LOCALITIES IN THE DISTRICT

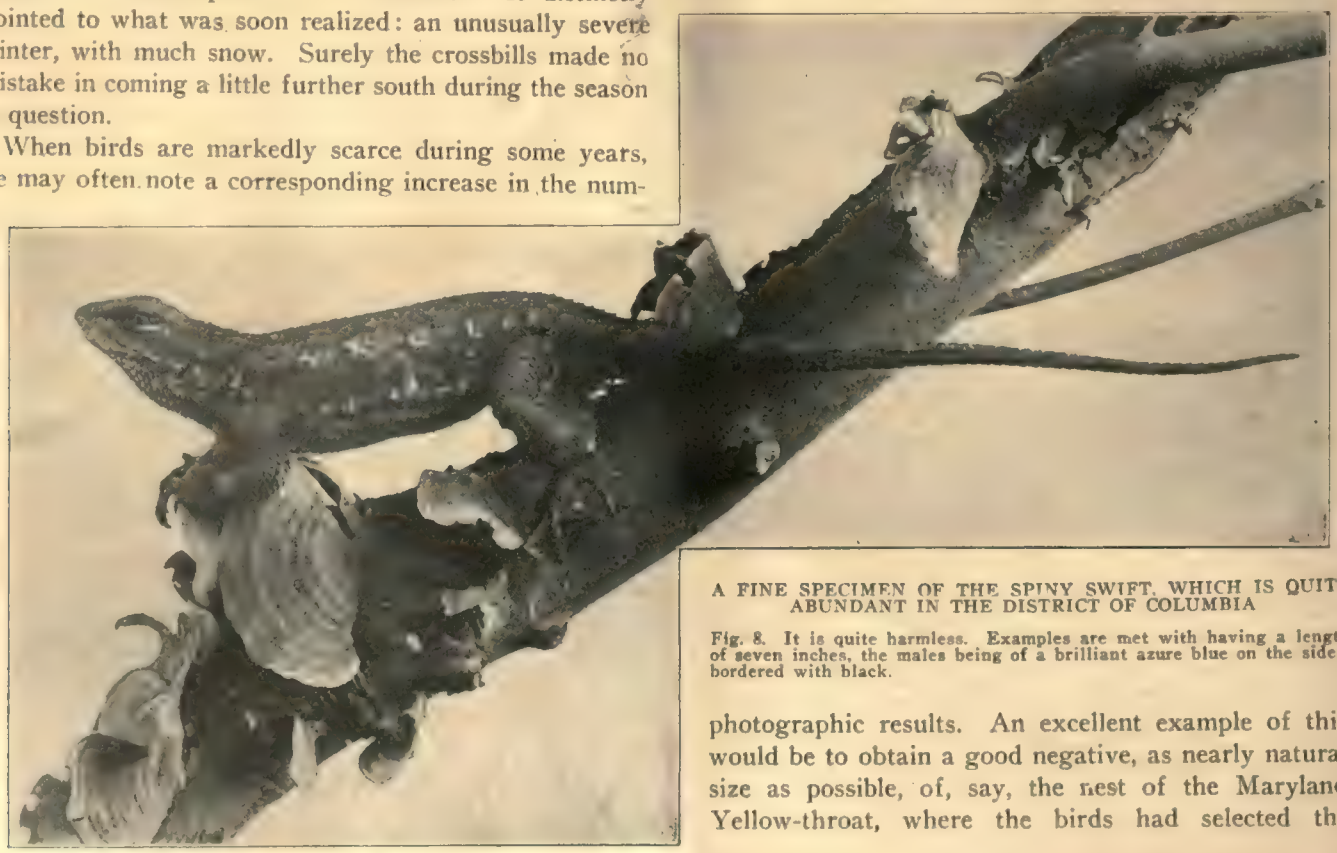
Fig. 7. This is one of our best-known parasitic plants, which obtains its sustenance either from roots or from decomposing vegetable matter. Note the Slimy Salamander in the shadow in the foreground.

tain species will put in an appearance in undue numbers for some cause or other, and that cause should be carefully investigated. An example of this was seen during last winter (1919-20), when a large number of common crossbills—a typical northern species—suddenly appeared in certain parts of the District. It distinctly pointed to what was soon realized: an unusually severe winter, with much snow. Surely the crossbills made no mistake in coming a little further south during the season in question.

When birds are markedly scarce during some years, we may often note a corresponding increase in the numbers of certain insects upon which those birds feed. A certain species of butterfly suddenly appeared in undue quantities—possibly for the reason that the species of bird that usually fed upon its larvæ was was not represented in sufficient force to destroy it and keep it down. The entire matter of the balancing of forces of this character may thus be studied, and the causes for the equipoise, or destroying the normal equilibrium in nature, as accounted for by the abundance or the reverse of certain animal groups, may be systematically considered.

Opportunities to study the nests and eggs of many species of birds, both water and land forms, are, to some extent, fairly good in the District. Certain marsh birds breed in the less frequented sections along the Potomac and Anacostia rivers—some species quite abundantly, as Marsh Wrens, Redwings, Rails, Waders, Sandpipers and others. Notwithstanding the number of times the nests and eggs of such forms have been described and photographed, good work along these lines is always both desirable and acceptable. Occasionally it requires not a little skill and patience to be thoroughly successful. The writer well remembers the experience he passed through, many years ago, when he secured, upon a sultry summer's day, a photograph of the nest which a pair of Marsh Wrens had built in a cat-tail swamp, where the mud was knee deep in some places. It required an entire forenoon to accomplish the object, which, in the end, was wholly successful. When undertaking such work, it is well to have a tripod with very long legs.

If the explorer is very fortunate, he will sometimes find certain birds breeding in unusual places; he should then put forth his best efforts to secure the very finest



A FINE SPECIMEN OF THE SPINY SWIFT, WHICH IS QUITE ABUNDANT IN THE DISTRICT OF COLUMBIA

Fig. 8. It is quite harmless. Examples are met with having a length of seven inches, the males being of a brilliant azure blue on the sides, bordered with black.

photographic results. An excellent example of this would be to obtain a good negative, as nearly natural size as possible, of, say, the nest of the Maryland Yellow-throat, where the birds had selected the

interior of the spathe of a skunk cabbage to build in.

Last September the writer collected between thirty and forty different varieties of toadstools and other fungi, within the range of a quarter of a mile from his home on Eighteenth street in Washington. These were all photographed natural size, and made a truly wonderful series of pictures. Later on they will be published with appropriate text; for it is really extraordinary how little is generally known of these growths, familiar as they are to many, in the places where they occur so abundantly



CRICKET FROGS OR "PEEPERS" ARE AMONG THE VERY EARLIEST HARBINGERS OF SPRING.

Fig. 9. This pair was captured along the marshy banks of a stream, where the species was quite abundant. In the early days of April the chirrupings of these little creatures have a charm for all of us.

within the District line; they make very charming subjects for photography when artistically taken. Then, too, they have a distinct value in other directions, not the least so to those foresters who have their homes *in the forests*, and who desire to draw when they can upon what the forest affords in the way of food. Mushrooms make an excellent dish for a change; but the dread of collecting the poisonous and even unwholesome species for the purpose deters hundreds of people—our foresters among them—from gathering them for the table.

Perhaps one of the most interesting studies for the explorer in the District of Columbia is offered on the part of the trees of its woods. Aside from the typical shrubs, there is a fine array of trees constituting the timbered parts of this domain. Much as dendrologists know of our trees, systematic studies of them as they occur in certain regions are always useful, and if the work is done scientifically and thoroughly, one can never tell of what economic importance it may prove to be in the outcome. One should start a series of good-sized albums in which to preserve the photographs made as part of the work. Here should be preserved photographs of isolated trees of all descriptions found in the area explored. Trees, as they constitute forests, should also be photographed; and this sort of work ought not to be confined to any particular part of the year, for a *leafless* tree, photographed in mid-winter, has a distinct value that a tree in full foliage does not possess. It exhibits the *real form* of the tree, and the arrangement and growth of its branches and twigs. Special parts of trees should also be abundantly photographed, as the character of the leaves and their variations; the bark and the several forms it takes on. Particular attention should be given to the flowers and fruit of the trees, and, when possible, the *plan of growth* of their roots. One of the best ways to secure a photograph of a normal root of any tree is to select one where the wind has blown it down and the rain has washed all the earth or soil from its roots. If such a tree has grown well away from others, in soft soil containing no rocks or cobbles or foreign bodies of any sort, and was advantageously placed as it fell, its root, with all of its rootlets, would, in many instances, offer an example of the *normal* growth of that species of tree. It is truly surprising how the roots of various species of trees differ. One of their most remarkable features is their outline, some trees having roots that sink down deep into the earth and branch in all directions, while others occupy almost entirely a space in the horizontal plane.



NEST AND EGGS OF THE WHITE-EYED VIREO

Fig. 10. This bird is one of our liveliest little songsters in the early days of spring, and its well-woven nests may frequently be seen on the twigs of bushes during the following winter.

It is often remarkable to note how little hold upon the earth some trees have through the media of their roots.

One frequently sees, for example, some enormous pine blown down during a severe gale. It is stretched out upon the ground for its entire length, with its roots more or less exposed. The latter are very often seen to be by no means extensive—in proportion to the size of the tree—nor did they by any means sink deep into the earth during its life; the wonder is that the tree did not blow



ONE OF THE PRETTIEST LITTLE BUTTERFLIES OCCURRING IN THIS REGION; IT IS KNOWN AS THE BUCKEYE

Fig. 11. During some seasons this species is quite rare, while at others it may be wonderfully abundant, more particularly in the South.

down before. Other species of trees have enormous roots that branch below ground in all directions. As a matter of fact, it is a very interesting study to carefully consider all that the roots of trees present, and the forester should allow no opportunity to pass whereby our knowledge of such a subject may be augmented.

NUT TREES FOR ROADS AND PARKS

MAPLES, poplars, elms, willows and the ailanthus are seen along roadways and in parks wherever public ambition for shade has been sufficient in degree to induce authorities to put in trees of one sort or another. For the most part our northern highways are unshaded except by such trees as may accidentally spring up by the roadside, and, after competition with various enemies, finally reach above the fences, writes Robert T. Morris, a member of the American Forestry Association of Washington, in the *American City* on "Nut Trees for Roads and Parks." Trees for city roads and parks, particularly in the larger cities, are often enough selected by some nurseryman favored by the political powers that be, and the nurseryman furnishes what he wishes to supply to the uncritical purchaser. The time for this sort of procedure is passing, and people are beginning to awaken on the subject.

Progress in civilization along this line will mean that we are gradually to dispose of the kind of trees that furnish nothing but bunches of leaves which in due season litter the ground and when swept up contain nothing more than incidental trash. Now, if these trees were to give place to nut trees and fruit trees, there would be very much besides leaves to be swept up in the autumn. One of my friends in Illinois told me that in 1918 he received $8 per bushel for his black walnuts of a particularly good kind, and that some of the trees bore as many as 14 bushels to the tree.

Suppose that we were to supplant willows and poplars along the roadside with trees which would give us bushels of product worth many dollars per bushel when the leaves were swept up in the fall. It is no more difficult to set out a black walnut than it is to set out a willow or poplar. The first cost is no greater if we set out seedling trees, although, if particularly good kinds of grafted black walnut are set out, the first cost is something more—yet negligible in view of the return. Investment in a nut tree differs from an investment in an industrial enterprise, for the reason that the plant of the industrial enterprise is decreasing in value from wear and tear the moment after it is completed. A nut tree, on the other hand, is increasing in value from the moment it is set out.

HALF THE BALSAM KILLED

CONSUMERS of print paper in this country say they are between the devil and the deep sea. Consumption has so far outstripped production that prices of paper have mounted to undreamed of heights. Many newspapers have been forced to suspend publication and others have been consolidated, while most of the big dailies are trying to conserve by reducing the number of their pages. The pinch of the paper famine is everywhere felt.

The Weekly News Letter of the United States Department of Agriculture says that two alternatives present themselves in the emergency: "The country must depend increasingly upon Canada," it says, "eventually abandoning many of its own mills, or the nation's policy with regard to its private forests must be radically changed. Of all supplies of paper, wood and pulp used by the United States about one-third now comes from Canada."

The tree known as Canada balsam or fir in Canada and the Eastern United States has come to be regarded as second only to spruce as a source of wood pulp. A very large proportion of the balsam of all of Eastern Canada and of districts in the State of Maine is either dying or dead. Canada's contribution of pulp and paper to the States is likely, therefore, to decline heavily in the next few years. Already there is said to be a movement in Canada to prohibit the exportation of pulp wood to the United States.

S. A. Graham, of the University of Minnesota, spent six months in the woods of Quebec and New Brunswick last year as a special field investigator of the Entomo-

logical Branch of the Canadian Department of Agriculture. He traveled 400 miles by canoe in Quebec and 125 miles on foot in New Brunswick in addition to other less extensive trips. He and his associates went to study the tragedy of the balsam and he has now made his report to Dr. J. M. Swaine, of Ottawa, chief of the Division of Forest Insects in Canada.

Mr. Graham found that the balsam had been destroyed indirectly by the lumbermen and directly by the balsam or spruce bud moth. Under the methods of logging employed, the balsam, which was looked down upon by the lumbermen when pine and spruce were to be had, was left standing until large districts contained little else than balsam or fir.

For a time the balsam in its isolation prospered mightily, but eventually its wonderful prosperity led to its downfall. A native insect, which under ordinary conditions causes but little damage, bred up to such large numbers when its natural food, the foliage of the balsam, appeared in such abundance, that it forthwith proceeded to defoliate and then to destroy the great forests of balsam which stretched for scores and scores of miles in the wilderness of Quebec and New Brunswick. Not until most of the dominant balsam had been destroyed, when, in other words, the bud worms had eaten themselves out of house and home, did the destruction cease. Then followed secondary insects, various kinds of bark beetles, which attacked and killed thousands of trees already weakened by the onslaught of the bud worn. These beetles breed in fresh slashings and in order to control them a general policy of slash burning has been recommended by the Division of Forest Insects.

Balsam deteriorates so rapidly that only a very small fraction of the dead or dying timber can be salvaged and used for pulp. This work is being carried forward on a large scale in New Brunswick, but the time is close at hand when no further shipments of "dead and down" can be made to the mills. When this time comes and the supply of commercial balsam is reduced to the minimum, then Canada's contribution of one-third of the supplies of paper, wood and pulp which are used by the United States will be materially reduced.

"More than 50 per cent of the balsam in Quebec has been killed," says Mr. Graham. "The only balsam trees remaining on extensive areas are the young reproduction and those which are growing in the shade of other trees. The earliest bud worm outbreak began in 1909 or 1910 on the headwaters of the Dumoine, Black, Coulogne and Gatineau rivers. This region became a great nursery where the pest reached its maximum concentration and from which it spread eastward into lands largely denuded of its timber except for the balsam. It was thus that the lumbermen had paved the way for the insect.

"The outbreak is over because the available food supply of the insect has been used up on large areas. It is probable that very little balsam is left except in the southern part of the province. With a large part of the available spruce cut, and the mills dependent more and more upon balsam for their future supply of pulpwood, this condition is a veritable catastrophe. The damage has been done and there is no immediate remedy."

Mr. Graham points out, however, that the widespread destruction of the Canadian balsam will have some recompense. "It it nature's remedy," he says, "of bringing the forest back from a condition of instability to a safer and more stable condition. The proportion of balsam in the stands has been reduced, while other species of trees have increased in like ratio."

The need of a constructive forest policy has been brought home to the lumber interests and to officials and specialists of Canada.

In the end the general forestry conditions may be greatly improved as a sequel of the raid on the balsams by the budworm, but for many years to come the loss will bear heavily on consumers of pulp and paper.

GERMAN FORESTS STILL GREAT ASSET

THAT the famous and well-tended State forests of Germany figure importantly in the industrial and economic rehabilitation of that country seems evident from recent information received by Gordon Dorrance, of New York, a member of the American Forestry Association, from Dr. Carl Alvin Schenck, of Hesse-Darmstadt, for 15 years famous in this country as the founder of the Biltmore School, and a forester of recognized rank in America not less than abroad.

Doctor Schenck declares that "German forests continue an A-1 asset. Our forest policy has been a conservative one, as you know. It reaps today what it has planted. Were it not for our forests the coal situation would be critical in the extreme. There is no coal whatsoever to be had for my house at Darmstadt; here in Lindenfels I have wood and some coke, enough for the time being.

"We require better economic conditions, safer than those now prevailing with reference to food and living. If our crops fail in 1920 there will be a disaster, a catastrophe by which the Black Plague of London is a million times repeated. Unfortunately, chances for reasonably good crops are few, and slight. There is no sugar to be had today; not an egg for the sick; no meat, of course—except for the rich and the very rich. Wages are high, but you cannot buy that thing for a stiff price which is not in any market.

"Our present forest policy continues to be conservative—much too conservative for me. If there were ever a time to empty a saving's box, that day has now arrived. Where the forests stand on farm soil they might well be converted into farms, although the authorities do not seem to approve of the change. Many of our forests might be thinned out twice as heavily as is customary, but the forester does not care to abandon the old practices.

"The price of forest products is high—in paper money. Spruce logs sell in the woods, 15 miles from the nearest railroad, at 2,000 marks per 1,000 board feet. Timber fit for furniture is beyond the reach of anyone. Nevertheless, the forest authorities do not cut more than the 'sustainable yield'—or as much as is replaced by our annual growth."

"HALL OF FAME" FOR TREES

What is probably the only tree in the world with a self watering apparatus provided by nature is the famous elm on the farm of J. Fred Johnson, near Kingston, Tennessee. There is a spring at the roots of the tree and as its age is estimated at between four and five hundred years, State Forester Maddox, of Tennessee, credits this long life to the spring. French explorers wrote of the tree in 1790 and said its circumference was twenty-two feet, which helps Forester Maddox to estimate its age for the American Forestry



Association, of Washington. The circumference is now twenty-five feet and it has a spread of 150 feet. Some time ago it was thought to be diseased and Governor Roberts directed Forester Maddox to treat it. The tree is now going along nicely and seems destined to see another four or five hundred years. Mr. Johnson claims the tree is the largest of its kind in the world.

Called the largest Acacia in the country, this tree has been entered in the Hall of Fame of the American Forestry Association at Washington. Is there a famous tree in your town? This tree was nominated for the "Who's Who" by G. W. Weakly, of Dayton. The tree is on the property of O. I. Gunkel and it stood in seventeen feet of water during the Dayton flood. The



oldest inhabitant of Dayton cannot remember when the tree was any smaller than it is now. The diameter is three feet six inches and the circumference is twelve feet six inches. The American Forestry Association is anxious to find trees with a history as well as trees of unusual size.

"HALL OF FAME" FOR TREES

Claiming it to be the most beautiful elm in the United States, John Kaiser nominates the Rathbone Elm, at Marietta, Ohio, for a place in the Hall of Fame for Trees. This tree has a circumference of 27 feet at three and one-half feet above the ground, and a circumference of 32 feet one and one-half feet above the ground. Of the five largest branches, Miss Waldine Rathbone informs the Association that the smallest



has a circumference of ten feet. The age of the tree is estimated to be close to 700 years by experts who have examined it. There have been many nominations for the Hall of Fame from Ohio, such as the Logan Elm, which marks the spot where a treaty of peace was made with the Indians at which time Logan, the Indian chief, made the oration now considered a classic.

This tree had its head shot off during a Fourth of July celebration in 1832. It is a memorial of the day and is now cared for by Spartanburg, South Carolina. The tree has been entered for a place in the Hall of



Fame of the American Forestry Association by John B. Cleveland. The tree is three feet in diameter, and during the nullification excitement a large union meeting was held on July 4, 1832. A cannon was loaded with leaves and twigs and without thinking of the aim the charge was let go. It was not high enough to miss the tree and the entire top was torn off. The tree is thirty feet high as it stands now.

A DAY WITH THE DUCKS ON LAKE CAYUGA

BY A. A. ALLEN, PH. D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

IT was seven below zero when we left the house and it had not warmed up a bit when we stepped from the train at the flag station at Willets and made our way to the blind on Long Point. It felt like a good day for ducks and the prospects for the day's hunt were excellent. For twenty miles the train had followed the shore of the lake, and, though the mist rising from the lake had obscured everything more than a hundred yards from shore, we had seen enough to know that the ducks were moving and that the canvasbacks had been frozen out of their best feeding ground at the north end of the lake. We therefore lost no time in traversing the long mile from the station to the blind and were soon tossing out the decoys. A stiff wind was blowing from the north, row after row of white caps were visible off the end of the point and a good surf was pounding on the north side. The moderately quiet water on the south side was, therefore, the place for the decoys and before long, we had two dozen male canvasbacks bobbing away at the left and an equal number of mixed female canvasbacks and bluebills at the right. It was difficult to keep our attention fixed on chipping the ice, which clung to the decoys from previous usage, and getting them all put out, when every once in a while some member of the party would call out, "get down," in the hope that a flock of ducks, that was seen coming, might fly close enough to the point to afford a shot. We were so conspicuous, however, on the bare gravel that though they were often headed straight for us, they always shied off before coming in range.



LARGEST OF THE DUCKS

The canvasback, in good condition, weighs 3½ pounds, but the black ducks often weigh four, and one exceptional individual weighed four pounds and eleven ounces.

The blind, as all of the shooting stands are called in this part of the country, was a box sunk in the gravel of the end of the point to such a depth that, when one sat in it, only his head and shoulders were above the level of the ground. A little gravel piled up behind the box and a few willow branches completed the deception and rendered one almost invisible so long as he remained motionless. When the point is covered with snow, white coats and hats are necessary to be really inconspicuous. The box had a low seat, was roomy enough for one to stretch out his feet, and held three men comfortably. I say comfortably, but no blind was ever invented that was comfortable on a cold day. The comfort has to come entirely from within, but it is strange how quickly one can change from a half-frozen, stiff, rheumatic, clod to a warm, mobile, energetic, human being at the mere sight of a flock of ducks directing their way toward the stools.



A PROMISING DAY FOR DUCKS

Low temperature, cloudy skies, and moderately strong winds make them fly the best. This is the beginning of the days sport—tossing out the decoys.

On this particular morning we had plenty of opportunities for observing this because by the time we were safely ensconced in the blind, it was after nine o'clock and the morning flight seemed to be over. The wind died down, the steam from the lake hung heavily over the decoys, sometimes almost hiding them from sight, and the ducks just seemed to stop flying. At least they did not come close enough so that we could see them through the mist. For fully an hour we sat there without seeing a duck. Occasionally a lone herring gull would sail by close enough to give

us a start for, if anything looks like two ducks in the distance, it is one herring gull coming head on. The black tips to the wings are the right distance apart and have just the right motion to suggest a pair of ducks, still far away but headed right for one. Earlier in the season the kingfishers fool one, but their resemblance



THE LAKE IS MUCH WARMER THAN THE AIR

Vapor rising conceals everything but the foreground and the decoys. A little more wind and it would be a perfect day for ducks.

to ducks is due to their actual size and shape and their method of flight while that of the gull is entirely a delusion. At another time we were startled by a swish of wings overhead and glanced up to see a black crow sail over from behind and start to alight on the shore in



SEVEN BELOW ZERO BUT EVERYONE HAPPY

Steam rising from the lake and drifting over the point obscures everything. One dared not close his eyes lest his eyelashes freeze together, and one scarcely dared to smile lest his face crack, but what did it matter if the ducks were flying?

front of us. It is always a good test of the inconspicuousness of a blind to have the crows come thus close, so we felt that at least we were not scaring the ducks away.

The icy mist was wafted over the point and froze to our gun barrels. It covered our heads with frost until white hats were almost unnecessary, and it formed crusts on your eyebrows. One dared not close his eyes lest his eye lashes freeze together, and dared scarcely to smile lest his face crack. All the extra layers of clothing and heavy socks seemed of no avail; we were gradually getting numb. Suddenly Sam exclaimed, "Here they come," and three faint black specks appeared in the south. "Art, you take the one on the right, Claude, you the middle, and I will take the one on the left. Let that be our program for the whole day and we won't be shooting at the same birds." On they came, the black specks rapidly growing larger, developing wings, and the form of ducks. Soon their blocky heads could be made out, conspicuous tails, and finally large white patches in their wings. "Whistlers," Same exclaimed in disgust, "they'll not come to our stools." Sure enough they passed the point out of range and never even bent their flight to look at the decoys. Early in the season the young whistlers or golden-eyes "stool" very readily to almost any sort of decoys but the winter birds become exceedingly wary and usually will not look at anything



AFTER THE SEASON CLOSES

Canvasbacks feeding close to the shore upon grain that has been put out for them.

but their own kind. One has greater success in hunting them with two or three decoys, somewhere along the shore where they feed, than with a large number on the points. They are inferior ducks for the table, however, especially late in the season when they become quite fishy in flavor, so that it does not pay to hunt them when better varieties are available. The passing of these three ducks, however, served to start our circulations and we were ready when Sam espied five more coming a little closer shore than the three that had passed. These had the same open formation of flight, and, though we could as yet not even make out the shape of their silhouettes, we surmised that they also were whistlers. If they kept to the line they were following, they would pass directly over the blind so this brought up the question, "Do we shoot whistlers?" "A duck is a duck until we each get one," replied Sam. "Let them have it." They were coming like the wind and in a thrice they were in range, over the decoys and headed for the blind not twenty yards

in the air. BANG, the shots rang out as one, and two of the handsome ducks spilled from the flock, "Who missed?" Sam looked rather sheepish and admitted that he had not fired. Ice had frozen his safety tight so that he could not pull the trigger. "If I'd only known you were not going to shoot," said Claude, "I would have shot another one for you." Further argument was checked by the appearance of a slender black thread in the distance above the mist. "Canvasbacks!" we exclaimed simultaneously," and headed right for us." Blacker and longer became the thread, stretched at right angles to the line of flight. Soon it broke up into a row of little black dots and we were busily counting them as they rose and fell, keeping ever in their line formation, three hundred, if there was one. Not a muscle did we move as they approached, the rhythmic movement of their wings seeming to keep time with our heart beats. "Too high, don't shoot," came in muffled tones from the generalissimo. We dared not turn to watch them as they passed directly over the decoys and then over our heads, their wings making music known only to the wild fowler. Once over we all turned to watch and see if any of them would be lured by the magic of the decoys. It is exceedingly unusual to have such a large flock come to decoys but often some of them will break away and come back. We had seen a few of them waver and crane their necks as they passed over and sure enough, they had flown less than a quarter of a mile when fifteen of them dropped from the flock, made a big circle over the lake and headed again for the decoys. Once more they were too high and we decided to let them pass. When they were almost directly over the decoys, however, they made one of their spectacular drops, we might almost say dives, for the lake and the decoys. With arched wings, they rocked first to one side and then to the other until instead of passing two hundred feet over our heads they passed barely twenty. Of course we were not ready to shoot, and we feared that they had seen us and would not circle again, but quickening their wing strokes as they barely skimmed the water north of the point, they made one more big circle over the lake and headed straight for the stools on set wings. If excitement ever claims the physical being of a man, it is at just this moment when he fears the birds will discover the delusion before they get in range and leave without giving him a chance to test his skill. "Remember your positions and choose your birds. Don't shoot until they are in range—NOW," came the orders. Bang, bang. Six shots rang out almost as two. At the first round three birds dropped, at the second but one. It is easy to pick your bird for the first shot, but for the second, instinct compels one to shoot at the nearest one, and as a result, we all fired at the same bird though there were eleven others within easy range. Four birds had dropped but as we now looked over the lake only two were visible. All of the diving ducks have a great deal of vitality and unless killed stone dead at the first shot usually dive when they hit the water and frequently get away. So we jumped from the blind to be ready for them when they should come up, for one cannot bear to let crippled ducks get away as the majority starve to death. When a crippled duck comes to the surface it usually swims very low against the water, sometimes



THE COLDEST PART OF THE DAY

Taking up the decoys is always cold work, for the hands because the wet anchor ropes soak one's gloves unless the temperature is low enough to immediately freeze the ropes upon exposure to the air.



TWO NICE BRACE OF CANVASBACKS

The most delicious and most highly esteemed of all the water fowl.

with only its bill protruding and is very difficult to hit in a vital spot. Three more shots were required to despatch one of the cripples and though three more were fired at the fourth duck, it finally got out of range of the shore and a lively chase ensued with the boat before we finally secured it. By the time we tumbled back into the blind, we had forgotten all about its being seven below zero, for we had worked hastily, and this, together with the excitement, caused by the numerous flocks of ducks that had flown by while we were out of the blind, caused us to feel that it was mid-summer. It is strange but it always seems to be so that the ducks fly best when one is putting out the decoys, when he is taking them up, or when he is out on the lake chasing a cripple. It was thus all day long. Occasionally we had to row out to the decoys to break off the ice which formed around them or to pick up one that had broken loose, and even if we had not seen a duck for an hour before, some always flew in close at such times and made us feel sorry that we had left the blind.

We sat in the blind talking things over and watching a bald eagle that had followed up the shore and perched in a dead elm near the base of the point when five more ducks were spied flying close against the water. At a distance they looked more like swallows than ducks for all one could make out was their rapidly moving black wings. As they came closer we could discern their white heads and long tails and we knew that they were old squaws. No self-respecting hunter shoots an old squaw any more than he would a merganser, for both are so fishy that they are impossible subjects for a white man's table. I desired a specimen of a nice old male in full winter plumage, however, to mount for the museum, and so I told Sam that, inasmuch as he had not fired at the whistlers, he could pick out the nicest bird from this flock as they went by and I would give him the body, after I had skinned it. We knew that they would not look at the decoys but their line of flight promised to bring them within long gun shot of the point. Almost any duck hunter is glad to shoot at an undesirable duck if he knows it is going to be utilized, so, as they swung by the point, Sam picked his bird and fired. "Well, I'll be good and thoroughly switched," exclaimed Claude. "All five at one shot; what sort of a game hog are you?" Sure enough, at the discharge of the gun, all five of the old squaws hit the water with a big splash. But they didn't stop going, and, to all appearances, they did not stop beating their wings, for when they came up again, far out of range, every one of them was flying as fast as when the shot was fired.



AT THE CLOSE OF A GOOD DAY'S SPORT

Nine canvasbacks, two bluebills and two whistlers. The law allows 25 to the individual or forty to the blind, but only "game hogs" kill that many.

The old squaws are strange ducks, and, especially in the spring during the courting season, go through many unusual maneuvers, chasing one another about, plunging into the water from a considerable height, playing and gambling like so many children. They are great divers, too, and are often caught in gill nets set for white fish in 150 feet of water.

Soon after the old squaws, came two canvasbacks that would have passed far out of range without looking at the decoys, but a low guttural note from the wooden "duck call" caused one of them to veer and swing close enough so that a long shot pulled it down. Another pair behaved much the same way only this time both of them came in range and both were added to the bag. Then came a great mass of ducks flying in close formation, low against the water. Redheads, was our guess while they were still so far off that even the individuals of the flock could not be made out, and sure enough, as they came closer, we could make out their dark forms, resembling bluebills much more than canvasbacks, but without any white in the wings. There were at least five hundred in the flock and though they came close enough for us to make out the red heads of the males, we had no hopes of their turning in to the decoys and they passed undisturbed. Earlier in the season redheads decoy very well to their own kind or to bluebill and canvasback decoys, but by the time winter sets in, it is only stray singles or pairs that will look at any decoys. They are clannish ducks and spend most of their time in compact "rafts" over beds of musk grass (Chara), and while with us are quite inferior to the canvasbacks. Indeed on Cayuga Lake the canvasback lives up to its reputation and excells all the other species. Of the diving ducks, bluebills and redheads are next in quality, and about on a par with each other. The canvasback is the largest also, with the exception of the black duck, and when in good condition weighs three and a half pounds or even somewhat more, while the redheads rarely tip the scales at three pounds, and the best bluebills weigh two and three-quarters. The largest bluebill I have ever seen, weighed an even three pounds and it was so fat that, when plucked, its legs appeared as mere bumps protruding slightly from the otherwise oval body. The black ducks, which winter on the lake, are much larger than those that pass through earlier, and by many persons are supposed to represent a different sub-species called the "red-legged black duck." Many individuals weigh as much as four pounds and one exceptional duck, taken in November of 1914, weighed four pounds and eleven ounces. The whistlers are the

same sizes as the bluebills, averaging between two and a half and two and three-quarter pounds.

But to return to our duck blind; the wind had risen again and was now blowing a gale from the north. The mist had cleared somewhat but the rollers were piling in so that we knew it would be impossible to go out in the little boat beyond the shelter of the point. We refused to shoot ducks that we could not retrieve so we resolved to shoot none that would not fall either in the shelter of the point or far enough inshore to the north so that they would drift ashore. No sooner had we made this decision than the ducks began to fly thick and fast, apparently stirred up by the quickening of the wind. For every one that passed within the shelter of the point or inshore to the north, there were ten that passed within easy range outside of the point, such that if killed they would have drifted down the middle of the lake. Before the sun got low in the sky, however, we managed to secure two more canvasbacks and two bluebills, making thirteen ducks in all, and we were ready to call it a good day's sport. If we were to judge by the bag limit, set by law, as to what constitutes a good day's sport, we would have had to acknowledge that we had just begun, for the law allows twenty-five to the individual or forty to the blind. Thank fortune, however, though the law may encourage a man to make a "hog" of himself when the opportunity offers, it cannot control his standards of a good time, and we did not feel that we had to carry home over a hundred pounds of ducks in order to say that we had had a good shoot.

Some day our children or children's children will ask what we did with the twenty-five ducks that the law allowed us to kill in one day and they will wonder why we did not let a few more of them live so that they could get an occasional shot at a real wild duck instead of at those raised in captivity and released. Some of us will feel quite ashamed of the age in which we spent our youth and will try to explain it away, but others of us will have to admit "It's history, my son; wild ducks, wild pigeons, wild bisons, are history, first come, first served."



THE LARGEST SAWS IN THE WORLD

HENRY DISSTON & SONS, INC., of Philadelphia, have recently finished two of the largest circular saws ever made. They are of the spiral inserted tooth type, and are to be used by a well-known concern in the Far West for cutting shingle blocks from the large trees of that section. Each of the new saws measures 108 inches (9 feet) in diameter, and in the rim are inserted 190 teeth. One may gain some idea of so tremendous a saw by comparing it with a 54-inch saw, which requires for its making an ingot of steel weighing approximately 180 pounds and its weight when finished is about 125 pounds. The 108-inch saw started out as an ingot weighing 1,140 pounds, and after reheating, rolling and trimming the remaining weight was about 795 pounds. In size a 54-inch saw is apparently just half that of the 108-inch one, but actually the 108-inch is four times the size of the former, as a measurement of square inches of surface will show. In the making of large circular saws Henry Disston & Sons have had long experience. As long ago as 1876 they made one 100 inches in diameter for exhibition purposes. Some years after they made another 100-inch saw for cutting stone, each tooth of which was studded with a black diamond to give the necessary cutting edge.

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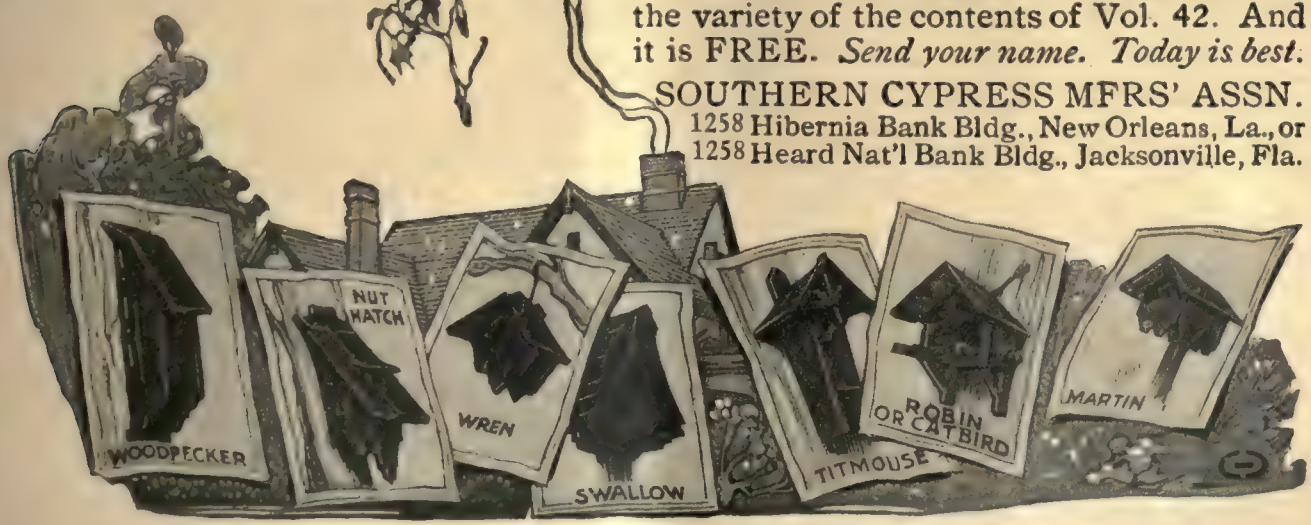
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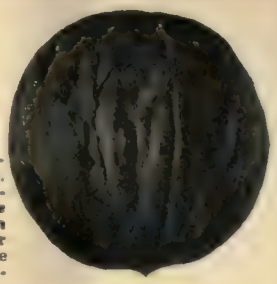




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BIG ARBOR DAY PLANTING

APRIL 9, 1920, fixed as Arbor Day by proclamation of the Governor of Maryland, witnessed a remarkable outpouring of the school children of Baltimore into the city's parks. About eight thousand boys and girls sealed their interest in public parks and trees by tree planting ceremonies, which took place in practically every park and public square in the city. Of the five hundred trees planted, each school planted and dedicated at least one.

The species chosen for planting were white oak, pin oak, red oak, black oak, mossy-cup oak, Norway maple, sugar maple, American elm, American linden, Oriental plane, white birch, red dogwood and Lombardy poplars.

The plan was worked out by the Park Board, with the hearty co-operation of the school authorities. Every member of the Park Board is a lover of trees—Mr. J. Cookman Boyd, the president, being particularly interested in the preservation of old trees as well as in replacement in cases of unavoidable loss. Hundreds of park trees are lost annually—torn by heavy winds, uprooted, shattered by lightning or a prey to blight or disease and sometimes victims of smoke and gases. The Board hopes that such replanting by the public school children of Baltimore will become an annual Arbor Day event, such occasions offering splendid opportunity for special instruction upon the necessity of tree growth to human life. The planting in the parks and squares, in which children take an active part, has splendid educational value in that it stimulates in children a serious and personal interest in tree life and growth, as well as in the park system. The trees they plant will grow up with them and their enjoyment of the parks will always hold pleasant personal memories for them. As it is the next generation which will benefit from such tree planting, it is most appropriate that it should be done by the school children of today. Baltimore's Park Board is to be commended for this fine achievement in tree planting.

ARBOR DAY FOR CHINA

THE College of Agriculture and Forestry at Nanking, China, is starting a movement that has as its ultimate purpose the reforestation of China's denuded hills by inducing all of the schools of the country, Chinese and foreign, to observe a Chinese national Arbor Day. Addresses have been sent out in English and Chinese to the schools of the country urging that an Arbor Day holiday be instituted and giving instruction in tree planting methods. It is intended also to supply seeds to the schools.

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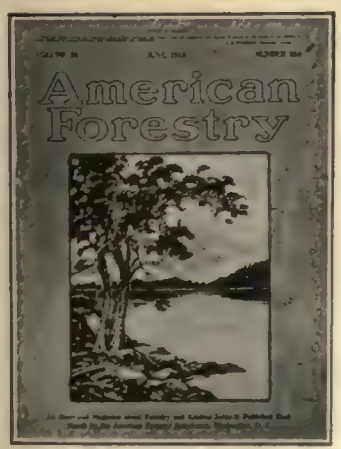


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BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

DURING the months of October, November and December, a co-operative experiment was carried out by the Commission of Conservation, and the Logging and Forestry Departments of the Laurentide Company, Ltd., under the direction of R. W. Lyons, to determine as accurately as possible what it costs to burn the limbs and tops of conifers on an ordinary logging operation. A camp was built about one-half mile from the nearest point on the experimental plot which contains approximately 175 acres. This had been cut over for white pine some years ago and was made up of the following types: spruce-balsam slope 27 per cent, black spruce swamp 11 per cent, balsam-spruce ridge 57 per cent, and softwood-hardwood slope 5 per cent. The tract as a whole sloped gently down to a swamp in the center. The timber is generally mature and over-mature in the 90 year age class and there is present much evidence of the damage of insects and fungi. In the order of their presence the species are, balsam, white spruce, black spruce, yellow birch, white birch and white pine. Balsam formed about 64 per cent of the stand and was younger and smaller than the spruce. The large trees were unsound, particularly on the ridges and in mixture with hardwoods. The largest balsam cut was 16 inches in diameter and 70 feet high. There was much wind damage.

The white spruce was not abundant but had long clear boles and long compact crowns. Some had attained a height of 80 feet and a diameter of 22 inches and were from 100 to 130 years of age.

The black spruce formed the stand in swampy place but reached its best growth on the higher ground, 60 feet, and a diameter of 13 inches. The trees were limby and the growth was decidedly slow. Reproduction on the tract was mostly balsam in thickets where wind thrown trees had left openings.

French-Canadian labor was used, the men receiving eighty dollars per month and board, but even at this figure were hard to keep. Camp conditions were a little above the average.

Clean cutting of the conifers in strips was the method of cutting. The strips were from one to three chains wide and between them timber was left uncut for a width of two chains. They were run at right angles to the prevailing winds. The slash on each alternate strip cut was burned. All logs were taken down to three inches in diameter except on a small section where the logs below four inches were left in order to see what the waste, utilizing to that diameter would amount to. These tops were measured and counted and the number of four foot pieces they would make recorded and calculated in cords.

The skidding was done by the Logging Department and charges for men's time, horse time and board were made against the operation.

A total of 14,588 thirteen and a half foot logs was cut amounting to 500.2 cords or 245,288 board feet, Quebec scale. The brush from 172.1 cords was burnt, an extra man being used for two felling crews. The average cost per cord for the operation where the brush was not burnt was $2.94 per cord, exclusive of skidding. Where the brush was burnt $3.46, so that the average cost of burning brush was $1.15 per cord or $2.30 per thousand feet.

The average distance skidded was about 250 feet with a maximum of 550 feet.

The costs are summarized as follows:

	per cord	*per M*
Felling, limbing and brush burning	$1.93	$3.81
Skidding	2.59	5.07
Improvements	.16	.31
Depreciation	.18	.36
Transportation of men into woods	.07	.14
Supervision	.49	.96
Board	1.44	2.82
Totals	$6.87	$13.47

The price per cord for this operation is no higher than for ordinary operations of like character and had the skidding been under the control of the man in charge the cost would have been reduced. The charge for supervision is very high as one trained man spent all his time on it. Had he been in charge of a whole district this item would have been very materially reduced. It is doubtful if the cost for burning could be reduced as the men who did the work had been previously accustomed to burn their debris. The question of whether it will pay to burn the debris from logging can only be solved by continuing such experiments as the above and studying the lands so cut to see what the effect is on reproduction, diminution of forest fires and on insects and fungi.

A lumberman who has been making a tour of the cutting operations in Ontario, reports that there seems to be a conspiracy on the part of the employment agencies sending men into the woods. The men go in but only stay a few days, sometimes not more than one day, and in one case where three gangs of six men each were used it took an average of 12 men per day coming in to keep the three gangs full. The man who made the report said it looked as if the agencies were splitting up the fee obtained from the employers with the "jumpers." He said conditions were better in the camps than ever before and that wages were high.

Several of the lumbermen's associations in Ontario have passed resolutions urging that the management of the forests of that Province should be placed entirely in the hands of the Chief Forester and his staff.

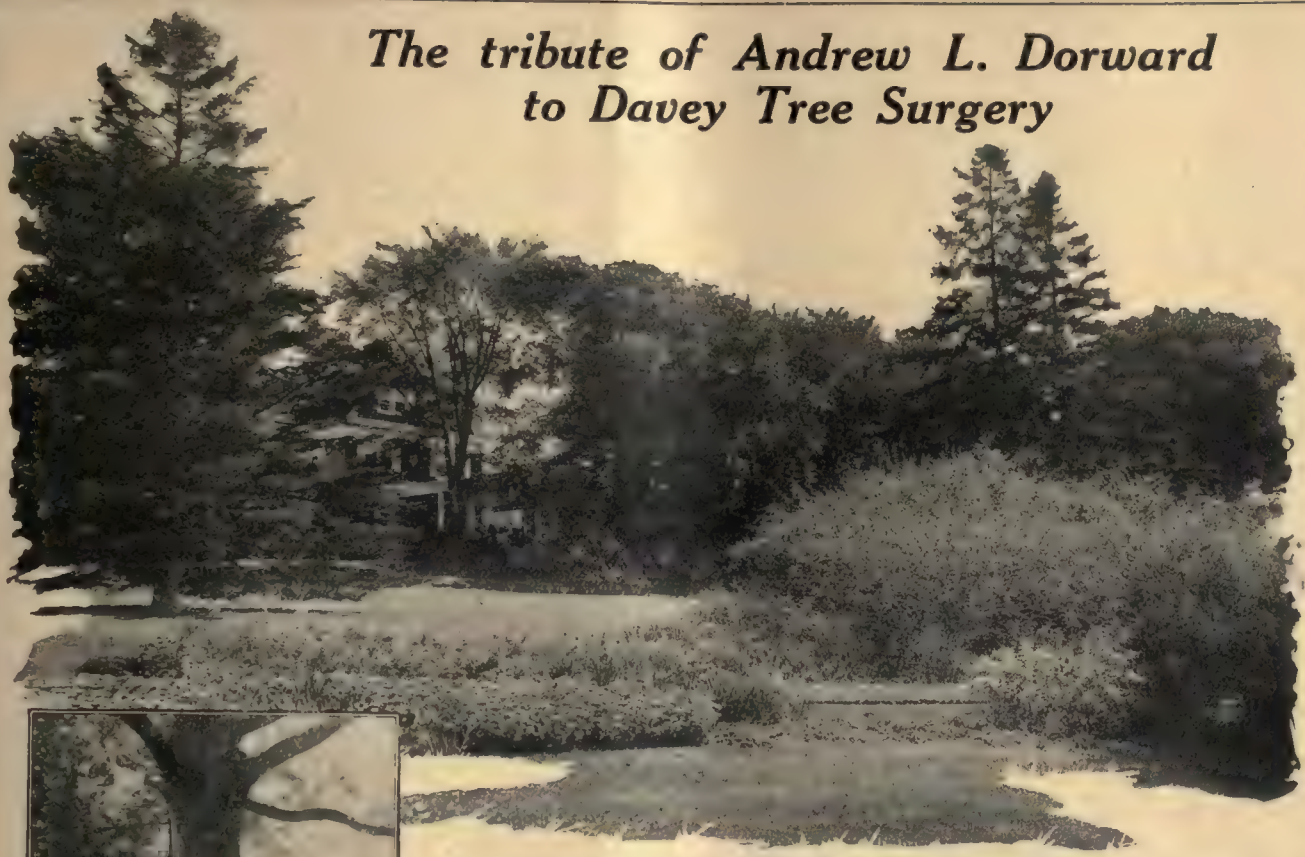
Clyde Leavitt, Forester of the Commission of Conservation, is trying to get an approximate estimate of the supplies of pulpwood standing in Canada. He thinks now that a liberal estimate would be, Quebec 300 million cords, Ontario 200 million cords, New Brunswick 33 million cords, Nova Scotia 30,000,000 cords and British Columbia 255 million cords. Not much information is available for the Prairie Provinces. This makes a total of 818 million cords. The cut is about 2¼ million cords per year. Efforts are being made to find out where this timber is located, that is how much there is which is at present accessible and how much which can only be reached when the price which can be paid for it will cover the cost of transportation. Estimates at present available are little more than the roughest kind of guesses and should not be relied on. It is certainly time to get some more accurate inventory of our resources. The increase in consumption is very rapid and shows no signs of diminishing.

Senior R. Codorniu, editor of *Espana Forestal*, has just published a very interesting book, which is a collection of articles written by him from 1916 to 1918, entitled "Mas Bagatelas Forestales."

Mr. Otto Schierbeck, a Danish forester, who was from 1909 to 1917 in charge of nursery work for the Danish Government, and from then till the present in the nursery business for himself, has just come to Canada to settle. He described to the writer the success they have had in Denmark in inoculating the moths of the white pine weevil with a fungus and liberating them to spread the disease.

The Curtiss Aeroplane Company are working on the designs for a flying boat especially for forest patrol and mapping work. This plane will probably be fitted with two engines.

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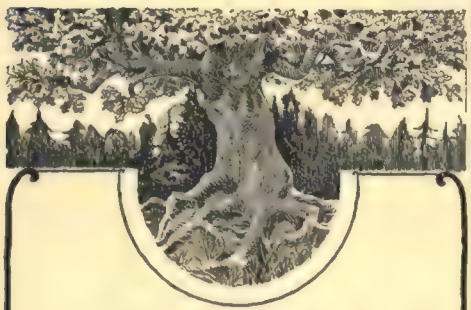
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PHILADELPHIA

At the annual meeting of the Canadian Forestry Association and at a subsequent meeting of the Directors a report for the year showed the Association in good financial condition with a large increase in membership. Mr. C. E. E. Ussher, of the Canadian Pacific Railway was elected President and Mr. Dan McLachlin, of Arnprior, Ontario, Vice-President. The number of Directors was increased by ten. Mr. Arthur Meighen, Minister of the Interior, was chosen as one of the new ones. A resolution was passed as follows:

"RESOLVED, That the Canadian Forestry Association desires to place itself on records as heartily approving of the expressed intention of the Government of Ontario to bring its Department of Lands and Forests up to the highest possible state of efficiency."

A very interesting conference on the Fur Industry of Canada, under the auspices of the Commission of Conservation, was held in the Windsor Hotel, Montreal, on February 19 and 20.

Forestry has lost a good friend in the death of Dr. C. Gordon Hewitt, head of the Department of Entomology in the Dominion Government. Dr. Hewitt was much interested in the protection of wild life and was one of Canada's representatives in framing the migratory birds treaty. His support of investigation work in forest entomology has been of great value to the whole subject of forest protection.

AMERICAN LUMBER ASSOCIATION

FORMATION of the American Lumber Association by leading wholesale lumber dealers of the United States, and declared to be the greatest lumber organization in the world in scope, capital and business represented, was effected in New Orleans early in March. The new association began operations the latter part of the month, with headquarters in Chicago. Its membership comprises wholesale lumber dealers in all important American cities, with selling connections in all parts of the world. L. Germain, Jr., head of a large concern that bears his name in Pittsburgh, Pennsylvania, has been selected as president of the American Lumber Association, and L. R. Putnam, of New Orleans, who resigns as director of advertising and trade extension for the Southern Pine Association, has been appointed manager. Mr. Germain also is president of the National Bureau of Wholesale Lumber Distributors, which was formed to serve the lumber needs of the United States Government during the war. According to Mr. Putnam, who made the announcement of the formation of the wholesalers' association, the same style of organization that handled the lumber situation for Uncle Sam during the war in the new association is enlarged in scope to meet the demands of world trade and to give the lumber consumer the same benefits that were enjoyed by the Govrnment in war times.

NEWSPRINT PAPER AND PULP WOOD

THE Department of Agriculture prepared information on newsprint paper and pulp wood for the Senate Committee on Agriculture and Forestry, and from it the following statements have been culled:

The use of pulp wood in the manufacture of newsprint paper has been developed only in the last 50 years.

Of all the paper used in the United States 22 per cent is used by the newspapers.

Before the war newsprint paper sold for about 2 cents a pound; now it sells in large quantities for 5 cents a pound and in small quantities up to 10 cents a pound.

In the last 20 years the use of newsprint has increased more than 200 per cent, while in the same period the population has increased 70 per cent.

Demand for newsprint will increase, instead of decreasing, in the future.

Dependence upon foreign supplies of pulp wood for newsprint means we will be at the mercy of foreign manufacturers as to prices. All exports of pulp wood from Newfoundland have been prohibited.

All exports from Crown lands in Canada have been prohibited.

Ten years ago the United States produced its entire newsprint supply; now we import two-thirds of it. Only one-third of the newspapers issued in 1919 were printed on the product of American forests.

Only one newsprint plant has been constructed in the United States since 1909.

Most of the pulp wood for newsprint is secured from New England and the Lake States. Spruce is used for more than half of it.

High cost of pulp and paper mills prevent manufacturing plants from following the timber as do saw mills.

Much pulp wood has now to be freighted 500 miles to the mills.

We bought nearly 1,400,000 tons of pulp wood from Canada in 1918, and prices advanced from $10 a cord to as high as $25.

Canada has increased her pulp mills 57 per cent in the last 10 years.

Indications are that supplies of pulp wood timber in New England and New York will be exhausted in 20 years. In New York alone supplies will be gone in 10 years.

In these sections the annual cut is about three times the annual growth.

There has been practically no development of the paper-making industry in Alaska and the Pacific Northwest, where our remaining timber supplies suitable for pulp wood are located.

At the present rate of cutting in Canada the supply in her Eastern provinces will be exhausted in 25 years.

Relief may be had by:

Developing the industry in the Northwest and in Alaska.

By perpetuating forests in the East and reproducing pulp wood timber in them.

Possibly by the collection and repulping of newspaper and its re-use by mixing with it new pulp.

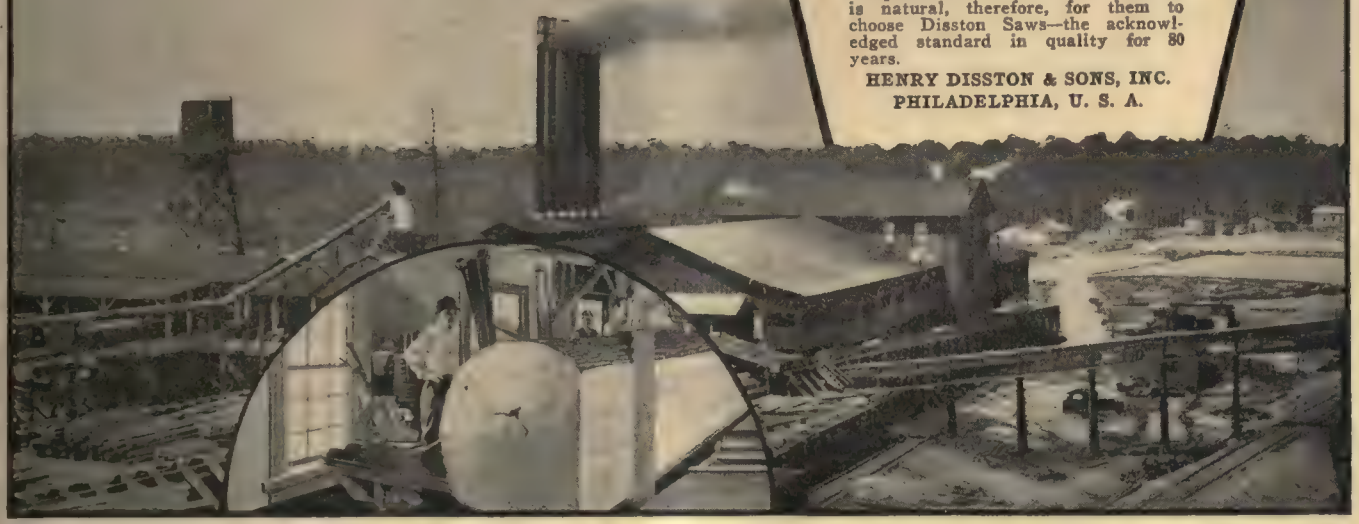
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I need a copy of **Forestry and Irrigation** for March, 1904. Will anyone who can furnish a copy please write me promptly? I should also like to hear from anyone who can supply copies of **The Forester**, bound or unbound, before December, 1900. I have quite a number of duplicates of **Forestry and Irrigation, Conservation** and **American Forestry**, the oldest being December, 1902, and should like to get in touch with anyone wishing to complete their files.
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STATE NEWS

CALIFORNIA

NEARLY 56,000,000 feet of timber, worth some $132,000, was the toll exacted by the more than 1,100 fires within the National Forests in California last year, according to District Forester Redington. And this in spite of the fact that 880 of the 1,100 fires discovered and fought by Forest Rangers were kept to less than 10 acres each. The Shasta Forest in Siskiyou and Shasta counties suffered severely, with a total of more than 28,500 acres burned, over 12,000 of which was in private ownership. Actual damage to timber was also greatest on the Shasta, for fires here destroyed $34,000 worth of Government and $42,000 worth of private stumpage.

The largest burned acreages, according to Forest officials, were in the brush country of the Angeles and Santa Barbara Forests in Southern California, where over 200 square miles of mountain watersheds were denuded of their vegetation.

Fires outside the National Forests destroyed timber and range worth, according to State Forester Homans, more than $386,000. This figure does not include damage to grain and hay, which totaled over $350,000, nor to improvements, valued at nearly $190,000.

The season of 1919 was considered the worst in California since 1910, Forest officials state.

ILLINOIS

ALTHOUGH 30 per cent of Illinois was originally covered by trees, two-thirds of this primitive forest area has been deforested, a good deal of it to its own injury and to the disadvantage of its owners, according to State Forester Robert B. Miller, who has entered upon his duties at the University of Illinois. With a view to establishing a permanent forestry policy for Illinois, a forestry survey of the State has been started. The objects of such a survey are, Mr. Miller states, to ascertain present conditions and values of our existing forests in order to know which of them should be permanently kept as forest properties and which may be more profitably cleared up, now or later, for agricultural purposes; to find forest tracts available, under cooperative management, for demonstration purposes; to select forest tracts which the State should acquire as permanent sources of supply to Illinois industries; to study the uses and values of the farm wood-lot as a feature in the management of Illinois farms; to study the advantages and disadvantages of the use of woodlands for pasturage by cattle, hogs and sheep; to study the geographic and local distribution within the State of the most important trees with a view to a choice, for preservation, maintenance and cultivation, of the kinds best adapted to each set of local conditions; and, finally, to study the relation of Illinois forests, and of their removal, to the problem of permanent water supplies, to the occurence of floods in streams, and the maintenance of underground waters at levels which will prevent their recession beyond the reach of crop plants in times of drouth.

The office of the forester, being at the University of Illinois, affords many opportunities for helpful conference and cooperation, especially with the topographical survey made by the Geological Survey of the State, the soil survey conducted by the Agricultural Experiment Station of the University, the Farm Management Bureau of the Experiment Station, the county farm advisers and the Extension Service—all located at the University.

LOUISIANA

THE Louisiana Department of Conservation, through its Division of Forestry, has recently given out its estimates of the amount of cut-over land of various kinds in the State. Heretofore in speaking of the cut-over land problem in Louisiana it has been necessary to use general terms and to employ figures which were at best very rough estimates. While the figures of the Department of Conservation are not claimed to be absolutely correct, they are based upon the most recent tax estimates, checked by the United States census, and various other sources of information; they are felt to be substantially correct. These figures show that on January 1, 1918, there were 12,260,000 acres of cut-over land in Louisiana, of which 8,195,000 acres are pine land, 2,685,000 acres hardwood land, and 1,380,000 acres of cypress swamps. All of these figures are exclusive of former forested land which has been cleared and put to agricultural use, or converted into pastures. In 1907 the number of cut-over acres is estimated to have been 7,895,000. This is a 50 per cent increase in 11 years. The department estimates that in the neighborhood of 5,000,000 acres of cut-over pine lands are practically without second-growth, although with proper fire protection more than half of this area, and perhaps as much as two-thirds, would reproduce naturally because of the presence of seed trees. Probably 3,000,000 acres in North Louisiana bear stands of second-growth pine and hardwoods, in some cases very fine stands. In announcing these figures on cut-over land areas Commissioner M. L. Alexander calls attention to the fact that whereas timbered lands are assessed at anywhere from $15 to $235 an acre, the cut-over lands are worth only $2 to $9. With the cut-over acreage increasing yearly by between 250,-

000 and 300,000 acres, there is a staggering loss in taxable values every year.

The annual forest fire report of the Department of Conservation shows the loss from fires during 1919 to have been the smallest in a great many years. While no fire records were kept prior to 1916, it is probable that not since 1905, when 75 inches of rain fell in the State, has so small an area of forested and cut-over land been burned over. A rainfall of 69 inches is, of course, chiefly responsible for the small loss, although in the portions of the State where fire patrol was maintained the State's campaign against fires has evidently borne fruit. 275,000 acres are said to have burned over, all in the long-leaf pine region. About two-thirds of this area was cut-over land, and the total damage of $130,000 was distributed as follows: To standing timber, $23,000; to young growth, $96,000; to grazing, $10,000; and to improvements, $1,000. This damage was done by 897 fires. The causes of the fires make an interesting study. 13 per cent was attributed to railroads, 17 per cent to lumbering, 5 per cent to brush burning, 4 per cent to hunters and campers, 3 per cent to miscellaneous causes, and 58 per cent to incendiarism. These per cents are for those fires the cause of which were known; as a matter of fact, nearly 88 per cent of the fires were of unknown origin. The very high percentage of incendiarism is due to the fact that three-fourths of the fires occurred during the Spring, at which time it is still the practice of many stockmen to burn off the old grass with the mistaken idea that it improves the range. Another source of incendiarism is the desire of knot gatherers and wood haulers to get rid of the tall grass which hides the material they are seeking. The State spent $1,750 for fire control in 1919, and received $2,100 from the United States Forest Service under the Weeks law for the same purpose. From one to thirteen men were on patrol at various times during the year.

A preliminary report on a study of the cost of logging and milling small timber was made public for the first time by the Department at the Southern Logging Congress in New Orleans in October. Some very interesting figures were presented, showing the extreme costliness of lumber from small trees of 12 inches in diameter and less, as compared with the cost of lumber from medium and large sized trees. For example, the cost of felling and sawing was three times as much per thousand for 8-inch trees as for 16-inch; skidding 7-inch logs distances up to 200 feet cost five times as much per thousand feet as for 14-inch logs; the cost of sawing 7-inch logs in the mill was nearly 90 per cent higher per thousand than for 14 per cent logs. The department intends to gather more and better information along the same lines, the figures as given out being preliminary and tentative. In connection with the study an attempt was made to approximate the over-run on logs of various sizes by actual tests at the mill.



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NEW YORK

AN appeal to the Legislature to extend the jurisdiction of the Conservation Commission of New York State to all the Forests of the State along lines similar to those upon which it is now exercised in the Adirondack and Catskill sections, is made in that part of the Commission's report relating to the work of the Division of Lands and Forests. Commissioner Pratt points out that the total area of farm woodlots in New York State is only slightly smaller than that occupied by the great Adirondack Forest, and that with a proper administration of the land best adapted for timber production, New York State should eventually be able to supply a large part, if not all, of its timber needs.

A special campaign to encourage the broadest possible recreational use of the State Forest Preserve and the St. Lawrence Reservation is being made by the Commission as "a public service of the greatest importance." Seven free illustrated "Recreation Circulars" have already been issued, and if funds are made available the work of improving and marking trails, the building of open camps and the construction of fireplaces throughout the Forest Preserve will be undertaken on a scale commensurate with the great use that the people are making of this public property.

Eleven new steel observation towers erected during 1919 bring the total number of such towers in use to 50, and leave only 4 of the Commission's fire stations still to be equipped with standard towers. The 266 forest fires reported by the observers in the Adirondacks and Catskills did damage to the extent of only $3,825, which is less than in 1918, and far below the average.

Additions during the year to the area of the Forest Preserve, which now totals 1,886,500 acres, were made at an average purchase price of $13.48 per acre in the Adirondacks and $6.26 per acre in the Catskills.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.35
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	2.50
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	1.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.35
LUMBER AND ITS USES—R. S. Kellogg	2.15
THE CARE OF TREES IN LAWN, STREET AND PARK—B. E. Fernow	2.17
NORTH AMERICAN TREES—N. L. Britton	7.30
KEY TO THE TREES—Collins and Preston	1.50
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record	1.75
PLANE SURVEYING—John C. Tracy	3.00
FOREST MENSURATION—Henry Solon Graves	4.00
FOREST PRODUCTS—By Nelson Courtlandt Brown	3.85
THE ECONOMICS OF FORESTRY—B. E. Fernow	1.61
FIRST BOOK OF FORESTRY—Filibert Roth	1.10
PRACTICAL FORESTRY—A. S. Fuller	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel B. Green	2.00
TREES IN WINTER—A. S. Blakeslee and C. D. Jarvis	2.00
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume	8.00
HANDBOOK OF THE TREES OF THE NORTHERN U. S. AND CANADA, EAST OF THE ROCKY MOUNTAINS—Romeyn B. Hough	6.00
GETTING ACQUAINTED WITH THE TREES—J. Horace McFarland	1.75
HANDBOOK OF TIMBER PRESERVATION—Samuel M. Rowe	5.00
THE HISTORIC TREES OF MASSACHUSETTS—J. R. Simmons	3.85
TREES OF NEW ENGLAND—L. L. Dame and Henry Brooks	1.50
TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst	1.50
TREES—H. Marshall Ward	1.50
OUR NATIONAL PARKS—John Muir	1.91
PRACTICAL FORESTRY—John Gifford	2.50
LOGGING—Ralph C. Bryant	4.00
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott	2.50
FORESTRY IN NEW ENGLAND—Ralph C. Hawley and Austin F. Hawes	3.50
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves	2.00
SHADE TREES IN TOWNS AND CITIES—William Solotaroff	3.00
THE TREE GUIDE—By Julia Ellen Rogers	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary	2.12
FARM FORESTRY—Alfred Akerman	.57
THE THEORY AND PRACTICE OF WORKING PLANS (in forest organization)—A. B. Recknagel	2.10
ELEMENTS OF FORESTRY—F. F. Moon and N. C. Brown	2.50
MECHANICAL PROPERTIES OF WOOD—Samuel J. Record	1.75
STUDIES OF TREES—J. J. Levison	1.75
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HANDBOOK FOR RANGERS AND WOODSMEN—By Jay L. B. Taylor	2.50
THE LAND WE LIVE IN—By Overton Price	1.70
WOOD AND FOREST—By William Noyes	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.	2.50
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THE HISTORIC TREES OF MASSACHUSETTS—By J. R. Simmons	3.65
TIMBERS—AND THEIR USES—By Wrenn Winn	5.15

*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

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OREGON

HOWARD J. EBERLY, of the State Forester's office, is a member of the Special Forestry detachment in attendance upon the Aviation School at March Field, California. This detachment also includes a number of United States Forest Service men from Districts 1, 5 and 6. A short, intensive course of study, embracing observation, airplane photography, mapping and radio work is being pursued by these men and is especially designed to give fundamental instructions covering airplane forest patrol work. Enlisted pilots are also receiving special training calculated to make them valuable in the extensive plan of the air service to provide airplane patrol for the timbered areas of the entire Northwest during the ensuing season.

If the lack of snow in the Cascade and Coast Mountain ranges is the barometer of a dry and hazardous fire season, the 1920 situation gives promise of record-breaking possibilities. Within the last few weeks a small amount of snow has fallen, but all of the usual heavily packed early snows have disappeared. Light and fluffy in nature, this slight recent snow will have trickled away before the season's patrol work is actually begun.

A present ten-inch shortage of normal rainfall would seem to add to the peril of the situation, but may, in the compensating nature of the elements, induce a rainfall late enough to partially offset the shortage in snow. With the usual wide and oftimes unexpected variety of weather, there is probably no occasion for alarm just yet, but it is not doubted that a greater sense of safety prevails with an abundance of snow in the mountains.

HIGHER PAY FOR FORESTERS

THE minimum entrance salary for Forest Assistants in the Federal Forest Service has been raised from $1,100 to $1,500 per annum, according to a recent announcemen. It is expected that this action will enable the Forest Service to secure graduates from the various forest schools. For the past few years men have been going into private work, owing to the inadequate salaries paid by the Government.

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TENNESSEE FORESTRY ASSOCIATION

A MEETING of much importance to the State of Tennessee was recently held in Nashville, the second annual conference of the Tennessee Forestry Association. Delegates from all sections of the State were in attendance, both men and women. The Association, only a little more than a year old, may be said just to have begun its work, but the spirit of the meeting throughout was that of appreciating the forestry problems of the State. After the opening address by the president, J. M. Overton, the Governor of Tennessee, Hon. A. H. Roberts, spoke on the Forests of Tennessee, in which he recognized the vital force which they are in the life of a State, and referred also to the necessity of applying scientific methods in the proper handling of them.

Col. H. S. Graves, Chief Forester of the United States, gave a most comprehensive address on the forest conditions in Tennessee and the entire country. He called attention to the important place Tennessee holds in the production of hardwoods and emphasized the great destruction and depletion of forest growth, the decreased output of lumber in Tennessee, and its consequences, there being less than half the amount of lumber produced now in the State compared to that of a decade ago. In the face of the recognized constant, useless depletion of the forest resources of the country, Colonel Graves stressed the futility of expecting a continuous adequate supply of forest products, unless they are assured through the operation of a national policy of forestry. In completing the program for the meeting, R. S. Maddox spoke on the subject of a "State Forest Policy," in which he mentioned the present status of forestry in Tennessee and also some measures which the State now needs.

Among the resolutions adopted was the following: "That the Tennessee Forestry Association favors a broad policy of forestry for the nation, looking to concerted action by the national Government, the States and private owners, to stop the destructive agencies that are injuring and devastating our forests; and that in working out such a policy there should be full recognition of the responsibility of forest owners to do their part in fire protection, and in encouraging natural replacement after cutting; also of the responsibility of the public to co-operate with owners so as to make these policies feasible and practicable."

MAPLE SYRUP IN THE SOUTH

THE Department of Agriculture states that many "sugar bushes" or maple sugar tree groves are found in North Carolina and Tennessee. The owners have not always had full knowledge of their value. For instance, the Department tells of one maple grove in North Carolina larger than any in New England, the trees in which were formerly cut and sold for lumber at $1.00 each. The sugar producing quality of the trees becoming known, they were tapped and last year yielded syrup that sold for $4.00 per gallon. Yet the world has considered Vermont as the source of all maple syrup, real and imitation, because Southern maple sugar has carefully concealed itself.

NATIONAL FORESTS NEED ROADS

THIRTY thousand miles of road, estimated to cost not less than $150,000,00, will be needed for the proper protection and development of the National Forests and the near-by communities during the next 10 years, according to comprehensive road plans which have been prepared. The Secretary of Agriculture has already approved the construction of 5,152 miles, estimated to cost $26,463,000, contingent upon Federal and co-operative funds becoming available. Government expenditures of $15,740,000 have been authorized for this purpose.

The roads comprised in the comprehensive road plans form the basis of the ultimate National Forest road system. They are used as main highways, either in connection with through routes or to serve important local needs. The construction of feeder roads is being largely postponed until the primary road system of the National Forests is completed. It is expected that the present estimate cost will be largely exceeded when surveys are made of the projects now on the list, since in many cases the only available estimates are based upon incomplete data.

THE HISTORIC TREES OF MASSACHUSETTS

BY JAMES RAYMOND SIMMONS

Secretary, New York State Forestry Commission

The author has written a brief historical treatise covering the period previous to the Civil War from the standpoint of trees as witnesses of the events chronicled. He knows his subject and writes in an interesting style with an appreciation of the beauty of trees themselves which he endeavors to inculcate in others. While the trees described are confined to Massachusetts their historic interest has no limitations.

The book is made with care. There are forty full-page plates printed in double-tone ink on cameo paper. The type is large, and margins are wide. An appropriate drawing has been made for the cover. Those who have seen the book are enthusiastic in its praise.

"A very beautiful book. Its text shows a patient and descriminating study, and its illustrations are superb. Mr. Simmons has done a good work well. His book is a thing of value and beauty."—Hartford Courant.

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SALE OF TIMBER QUINAIELT INDIAN RESERVATION MOCLIPS UNIT

SEALED bids in duplicate, marked outside "Bid, Moclips Unit," and addressed to the Superintendent, Taholah Indian School, Taholah, Washington, will be received until twelve o'clock noon, Pacific time, Tuesday, June 1, 1920, for the purchase of timber on the tract in Townships 20 and 21 north, Ranges 11 and 12 west, Williamette Meridian, in Quinaielt Indian Reservation. The said unit includes about 3,560 acres, with a total stand of about 125,000,000 feet, of which about 70,000,000 lies in about 1880 acres of allotted land, as to which separate approved contracts with the Indian owners may probably be made. The sale embraces approximately 70,000,000 feet of cedar, 19,000,000 feet of Douglas fir, 14,000,000 feet of spruce, 20,000,000 feet of hemlock, 1,000,000 feet of white pine, 578,000 linear feet of cedar poles, and an unestimated amount of Douglas fir piles. Each bid must state the price per thousand feet Scribner decimal C log scale, that will be paid for timber cut and scaled prior to April 1, 1924. No bid will be considered for the first period of less than the following rates per thousand feet: Three dollars fifty cents ($3.50) for live and dead cedar; three dollars ($3.00) for live and dead Douglas fir and spruce; two dollars ($2.00) for white pine; eighty cents ($.80)) for hemlock, white fir and other species; per linear foot for cedar poles 45 feet and over in length with not greater than a nine-inch top diameter, one and three-fourths cents (.0175); for cedar poles 45 feet and under in length, one and one-fourth cents (.0125); for cedar poles 20 feet and under in length with not greater than a six-inch top diameter, three-fourths cent (.0075); and for Douglas fir piles, with not greater than a sixteenth-inch butt diameter, one cent (.01) per linear foot. Each bid must be accompanied by a certified check of $10,000. The deposit will be returned if the bid is rejected, but retained as liquidated damages if the required contract and bond are not executed and presented for approval within sixty days from the acceptance of a bid. The right to reject any and all bids is reserved. Copies of the bid and contract forms and other information may be obtained from the Superintendent, Indian School, Taholah, Washington. Prices subsequent to April 1, 1924, will be fixed by the Commissioner of Indian Affairs by three-year periods.

Washington, D. C., March 17, 1920. CATO SELLS, Commissioner of Indian Affairs.

SALE OF TIMBER, MESCALERO INDIAN RESERVATION, ELK AND SILVER CREEK UNIT

Sealed bids in duplicate, marked outside "Bid Elk and Silver Creek Unit," and addressed to Superintendent Mescalero Indian School, Mescalero, New Mexico will be received until twelve o'clock noon, Mountain Time, Saturday, May 1, 1920, for the purchase of timber on a tract within the Elk and Silver Creek drainage areas on the southern part of the Mescalero Indian Reservation lying west of the range line between ranges 14 and 15 East of New Mexico Principal Meridian. The said unit includes about 30,000 acres of unallotted timber land with an estimated stand of one hundred seventy million feet as to which contract will be made with the superintendent. Approximately 55 per cent of the timber within the unit is western yellow pine (including so-called "Black Jack" or "Bull Pine,") 30 per cent Douglas fir and 15 per cent white fir, Mexican pine and Engelmann spruce. Each bid must state the price per thousand feet Scribner Decimal C Log scale that will be paid for timber cut and scaled prior to April 1, 1925 Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three year periods. No bid of less than three dollars ($3.00) per M feet for yellow pine and Douglas fir, two dollars ($2.00) per M feet for Mexican white pine and Engelmann spruce and one dollar ($1.00) per M for white pine during the period ending March 31, 1925 will be considered. Each bid must be accompained by a certified check on a solvent national bank, payable to the Superintendent of the Mescalero Indian School in the amount of ten thousand dollars ($10,000.00). The deposit will be returned if the bid is rejected but retained as liquidated damages if the required contract and bond are not executed and presented for approval within sixty days from the acceptance of a bid. The right to reject any and all bids is reserved. Copies of the bid and contract forms and other information may be obtained from the Superintendent, Indian School, Mescalero, New Mexico.

CATO SELLS,
Commissioner of Indian Affairs.
Washington, D. C., February 14, 1920.

FORESTER SAVING CZECHO-SLOVAKS

THAT a former District Forester of the Arizona-New Mexico district has directed the work of saving half a million children from starvation is the word brought from Czehco-Slovakia in a letter from the Czech Government requesting from the Forest Service an extension of leave for Capt. Arthur C. Ringland, formerly District Forester of the Southwestern District, with headquarters at Albuquerque. The letter is addressed to the Director of the European Children's Fund of the American Relief Administration, and is signed by Dr. Alice Masaryk, daughter of the President of Czecho-Slovakia, and by two high ministers of the Government. The letter is in part as follows:

"The American nation has saved about half a million Czecho-Slovakian children from starvation in the most critical time before the harvest of 1919. The national organization of the "Cezkoslovenska Pece o dite," with the President of the Republic as head and all Ministers of the Cabinet as members of the National Committee, is distributing the American food to the remotest districts and places of our country. The soul of this organization, unique in the history of our nation, is Mr. Arthur C. Ringland, one of those excellent workers whom you sent to Europe to accomplish your wonderful plan to help small nations and enable them to face the consequences of war."

FOREST FIRES IN CALIFORNIA

THE Forest Service has been able in California, through comprehensive plans, complete organization and execution, and co-operation from timber owners and the public, to reduce in the past 12 years the annual fire destruction of merchantable timber in the National Forests in that state by 81 per cent or some 94 million feet. That fires started by lightning were of common occurrence in the pine forests of northern California as early as 1530 is a fact established, says the District Forester at San Francisco, by the examination of old fire scars on still living trees. Naturally none of the trees examined had survived every one of the many fires recorded in the past two or three hundred years but several bore scars from which were traced the occurrence of more than 20 conflagrations each one separated by a number of years. One tree, the oldest examined in Plumas County, has very evidently survived 35 separate and distinct fires. Because it is evident that these fires were not holocausts because much of the area over which they burned still bears merchantable timber, some have questioned the need of extensive fire protection in California forests or of particular attention to the light ground fire. It is estimated, however, that ground fires in California actually destroy on the average, 1183 feet of timber per acre or $4.45 in value.

TWO-THIRDS OF EACH TREE WASTED

"AT present two-thirds of the average tree is wasted before the wood is put to use," said C. P. Winslow, Director of the United States Forest Products Laboratory, in an address at a recent meeting of the Madison Section of the Society of American Foresters. "Without doubt, a considerable part of this waste can be used," he added, "and it is the function of forest products research to develop every possible new use, within the limits of the financial resources available for such work. Such better utilization also has a vital relation to the practice of forestry on private lands, by making possible a greater net return per acre, thus making continuous production of private forests more financially attractive than at present." Among the new uses of wood now being developed which may have profound effect upon future forest production, Mr. Winslow mentioned the use of "built-up" wood, in which small pieces of wood are guled together into laminated parts of various shapes and sizes, which can be made just as strong and useful as an equal amount of solid wood. The increasing uses of laminated wood make it reasonable to assume that many of the forests of the future can be profitably cut at an earlier age than at present with much closer utilization of the trees grown, thus naturally increasing the financial return per acre. The greater utilization of wood waste and wood in the smaller sizes for chemical products and paper pulp was also given as a fertile field for research.

FORESTERS TEST WIRELESS PHONES

PRELIMINARY tests of the wireless telephone by officers of the Forest Service, United States Department of Agriculture, in the vicinity of Portland, Oregon, lead to the belief that this invention can be utilized extensively in the National Forests, especially in fire-prevention work. While it is recognized that there are conditions limiting wireless telephone transmission, the results so far are pronounced very satisfactory.

One of the sets used in the tests was installed on Mount Hood, Oregon, where the problem of providing a satisfactory support for the antennae was a difficult one, since a mast was needed which would be strong enough to resist the 70 or 80 mile gales that sweep the mountains. At the same time the mast had to be light enough for the men to be able to raise and lower it before and after sleet storms. A 50-foot bamboo pole was finally selected as the support.

In the telephone conversations between the sets, some of which were 10 miles apart, the voice carried very clearly and was about as loud as over a wire line. Telegraph signals from many stations scattered over the continent were picked up. On Mount Hood they often w[illegible] loud as to be audible in any part [illegible] cabin.

FOREST SCHOOL NOTES

IDAHO FOREST SCHOOL

THE Associated Foresters of the University of Idaho Forest School held their fourth annual banquet March 10, at Moscow, Idaho. Forty members and their guests were present, among the latter being President E. H. Lindley, of the University of Idaho; A. D. Decker and Donald Yates, of the Potlatch Lumber Company, of Potlatch, Idaho, and Major F. A. Fenn, chief of the office of lands in District 1 of the United States Forest Service at Missoula, Montana. Prof. C. Edward Behre acted as toastmaster. Mr. Decker spoke on "The Practice of Forestry by Private Owners," and expressed the opinion that progress along this line could not be successfully secured by mandatory legislation, but that the solution of the national forestry problem lay along co-operative lines. President Lindley, of the University of Idaho, talked upon "The Spirit of the Forester." Mr. A. S. Daniels, president of the Associated Foresters of the University of Idaho, outlined the history, activities and aims of the forest club. Mr. Yates, in discussing the logged-off land problem, outlined an idea for removing and utilizing the waste material on logged-off land for agricultural development by a stock company undertaking the production of fuelwood, resinous by-products and pulp for the utilization of the material now destroyed. He believes that, although no one of these industries can be profitably conducted on the supply of raw material from cut-over land at present, that an enterprise which undertook all at the some time would succeed. Mr. H. W. Staples, of the senior class of the Idaho Forest School, talked on airplane fire patrol, basing his remarks on experience gained as lieutenant in the United States Air Service during the war. Mr. H. W. May, a United States Forest ranger, pointed out the advantage to the field man in coming to the University of Idaho for the short course. Major F. A. Fenn, spoke upon his work with the Forest Service in developing the recreational uses of the National Forests. Major Fenn has the distinction of being one of the first six pupils to attend a public school in Idaho territory and has been in the United States Forest Service for over 20 years. Some of the interesting incidents of the early days of the Forest Service related by Major Fenn were a revelation to those who knew the Forest Service only from its present stage of development and prestige.

YALE FOREST SCHOOL

THE Fourth Annual Convention of the Intercollegiate Association of Forestry Clubs was held recently in New Haven, under the auspices of Yale, the present President Club. The meeting was in every way a distinct success, and owing to the number of Yale alumni present the occasion partook of the nature of a reunion. The meeting adopted insignia for the Association, provided for a quarterly publication to be issued by the president club, and elected the University of California as president for the coming year. The next convention will accordingly be held in Berkeley.

The speakers and the subjects of their talks were: "The Profession of Forestry," Prof. H. H. Chapman, New Haven, Connecticut; "How Can the Forester Help the Lumberman?" T. L. Bristol, Ansonia, Connecticut; "The Work of the Consulting Forester," J. T. Rothery, New York city; "The Undergraduate Student of Forestry," J. H. Briscoe, Orono, Maine; "The Student of Forestry, and State Service," E. C. Hirst, Concord, New Hampshire; "The Student of Forestry and Research," S. T. Dana, Washington, D. C.

The speakers at the banquet were: Dean Toumey, Colonel Woolsey ('03), Major Marston ('02), E. C. Hirst ('09) and Mr. Rogers, of the Indian Forest Service.

The Senior Class, fifteen in number, has gone to Urania, Louisiana, for the spring field work. The spring work is in charge of Professors Bryant and Chapman, and will be conducted on a large Southern pine operation on the property of Mr. Henry Hardtner. The location selected for the work this year is familiar ground, as the work with the class of 1918 was conducted on the same property.

Dr. H. N. Whitford sailed early in April for six to eight weeks' field work in examining a tract of timbered land in Dutch Guiana. He is planning to secure a full collection of woods and herbarium material from the region visited. Recent additions to the tropical woods collections at the Yale School of Forestry have brought the total of such woods to nearly 4,000 specimens. Representatives of the principal woods of nearly all the South American countries and many other parts of the tropical world are now in this collection. Professor Record, who is classifying these words, is constantly receiving numerous samples from many sources for identification.

Mr. N. M. Matthews, Conservator of Forests for North Borneo, has been a visitor at New Haven for the past several days and gave an interesting address before the Forest Club on the evening of March 16. Mr. Matthews is enthusiastic

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C. (3-5-20)

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

DISCHARGED SAILOR would like position as assistant forester or a permanent position as surveyor with some lumber company with a chance for advancement. Salary is of secondary consideration. Married, so would have to locate in some small town. Have had four years' practical experience in general forestry, and some tree surgery. Address Box 900, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-7)

POSITIONS OPEN

WANTED—Working Assistant Forester for local Forestry Department in connection with forestry work in parks, nursery and landscape planting. Good opportunity for ambitious young man not afraid of work. State qualifications, salary expected and references. Address Box 890, care of American Forestry. (3-6-20)

WANTED—Man capable of Supervising Slack and Tight Barrel Plant; Purchase and Inspect Cooperage Stocks; Develop Boxes, Crates and other Packages for miscellaneous articles. State experience, salary wanted and references in first letter. Address Box 123, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-5)

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over the potential resources of Borneo, and looks forward to great developments in that part of the world in the immediate future. He has just returned from London, where he has been instrumental in floating a large company for the exploitation of Borneo timber.

FORESTERS AID IN SHADE TREE PLANTING

FOREST Examiner F. S. Baker at a recent meeting of the Society of Intermountain Foresters, at Ogden, Utah, commented on the street trees of Ogden and other Intermountain towns and pointed out the need for careful study and selection of the trees to be used, and proper care of the trees after they are planted. He stated that the practice which obtains of promiscuously chopping off the tops of shade trees, apparently with the idea of making them spread in the top and yield more shade, and of course also to make room for wires, is a pernicious one, which civic organizations should take steps toward abolishing. He also urged that each community should formulate a definite plan for the planting of shade and ornamental trees within its limits, and adhere to that plan. He urged the foresters of the Intermountain region to actively interest themselves in this work and in their travels throughout the region to actively assist community leaders in such work. He also urged that careful study of existing situation should be made with a view to securing accurate and complete data on the trees best adapted to the different parts of the Intermountain region, in order that the foresters may be of greater assistance to communities and individuals who are constantly applying for such assistance in developing this community activity.

GROWING NATIONAL FOREST RECEIPTS

RECEIPTS from the National Forests for the seven months ending January 13, 1920, totaled $1,418,144.18 as against $1,111,321.21 for the same period of the last fiscal year, according to reports to the Forest Service, United States Department of Agriculture. This is an increase of $306,822.97. Timber sales show the largest increase, $271,175.42. Water power comes next, with $17,450.54, followed by special uses, $7,600.61; and grazing, $7,022.23.

FORESTERS FROM INDIA TO COME HERE

A representative of the British Government visited the Forests Products Laboratory at Madison recently to arrange for a later visit of 12 forest engineers whom England is sending to India to establish a forest policy there and to solve problems of reforestation, wood utilization, etc., in that richly forested country. They will make a tour of the United States in the summer and will spend some time at the Forest Products Laboratory studying methods, tests, etc.

MILLION TREES FOR NEBRASKANS

MORE than a million trees from the Bessey Nursery at Halsey, Nebraska, have been distributed among 5,080 people by the Forest Service, United States Department of Agriculture, since 1912. Those receiving the trees are residents of the Kinkaid enlarged homestead district, a special provision in the act creating this district having provided that the residents should be entitled to receive trees from the Forest Service. Recently steps have been taken to get the largest benefit from the distribution of trees by arranging with the county agents in the districts to receive applications for trees, to assist in planting trees, and to make annual reports regarding the condition of trees coming under their notice.

FORESTRY LECTURES FOR TEACHERS

THE school children of Denver are enjoying special opportunities to learn much of value regarding practical forestry problems. A local representative of the Forest Service of the United States Department of Agriculture is giving a series of lectures on subjects relating to forestry to 200 Denver school teachers who, in turn, pass on the information to their classes. The lectures are illustrated and deal with fire protection in the forests, forest improvement, grazing, tree planting, game preservation and similar topics. Work of a somewhat similar character is also being carried on by a forest ranger in Portland, Oregon, who has arranged to give talks to the Boy Scout troops in his vicinity.

CREOSOTE SOFTWOOD POSTS

THE present high prices of fence posts make it necessary to find something cheaper that can be found near home. Professor G. B. McDonald of the forestry department at Iowa State College has found that softwood posts when treated with some preservative will last as long as the hard wood posts and the only expense is the work of cutting and the preservative used.

Posts to be treated must be peeled and seasoned. An unseasoned post will not take the creosote well and after seasoning in the ground wide cracks open up deeper than the preservative penetrated and decay will start.

FOR A FOREST POLICY

AT the recent annual meeting of the Western Retail Lumbermen's Association resolutions as follows were adopted:

"That the Governors and Representatives in Congress of the Western States be asked to assist in bringing about legislation to formulate a broad national policy of early reforestation of denuded areas in these States.

"That the plan for the establishment of field posts in the National Forests be endorsed and that Congress be urged to provide a reserve line of defense for Forest Service patrols."

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

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THE CONVENTION OF THE BIRDS AND TREES

BY MARY LEE HAWLEY

LITTLE friends, do you think Fathers and Mothers and People decide everything? They say January first is the beginning of the New Year, but long ago the birds called a convention and said it was absurd—they would not have it so. You know Mr. Bluejay? Well, he was in the chair and all the lady birds were allowed to speak, for the birds believe in Equal Suffrage.

MADAME Woodpecker said too many times Mother Nature had come out on January first and looked about, only to sneeze and turn back. She had all she could do to keep her baby buds wrapped and warm until April first. This they all declared was New Year's day—and would be forever. January first? Bah!

THE trees held a convention too; and you know they can shiver, bow, beckon and sigh, but they cannot move about. So in payment for summer quarters, the birds act as their messengers. Each year they select a queen for Arbor Day and there is much excitement about their choice. It is just like your May Day queen, you know. In 1872 a man from Nebraska originated Arbor Day and a million trees were planted that first year. J. Sterling Morton set a great value on trees and he was right.

THE oldest and largest living thing is a Sequoia tree in California, named for Gen. Sherman. The second oldest and largest grows nearby, and is named for Gen. Grant. The former was a baby sapling over 3,000 years ago, when Moses lived.

SO the trees may well boast, but their queen will not be chosen from these this year, for an awful thing has happened, and since the war, the question will be decided as to who gave the most.

THE big forces of any war, of course, are ammunition and food. Do you know what the third one was in this? WOOD; and wood means trees. The birds joined the Allies at the beginning to guard the crops that the soldiers should have plenty of wheat, corn, oats, etc. They are so happy to think they helped that they have been earlier than usual this year in flying about as messengers for the trees. Each tree whispers her own reason for thinking she ought to be queen, and if we only understood, we would hear the birds as they go about electioneering.

THE Sitka Spruce expects to be chosen this year. She says, "Airplanes won the war. In all the Western Hemisphere, they had to come to this little ribbon of land, beginning in Northern California and continuing through Oregon, Washington, and the islands and mainland of British Columbia."

THE Southern Pine, who has given an average of 4,300,000 feet for each army camp, thinks she has a right to reign as queen. She made it comfortable and sweet for our soldier boys, when they were first taken from their homes. Many birds boost the fruit trees. "For," they say, "do you not remember last year, how the pits were called for, to be used in ammunition? And their fruit filled cans to feed the world? Beside, they are so pretty and entice us to sit in their branches while we watch for the right moment to swoop down on our enemy—the chinch bug."

BUT listen to the Oak's plea. "We furnished the railroad ties, without which our boys could not have been transported and many, many carloads were shipped to France from the Ozarks of Missouri. We also helped to build the ships.

LITTLE Miss Jenny Wren speaks up for the Maple. "You have not forgotten the sugar shortage and how much sweetness the maples give." The Cedars were not to be overlooked. "Think of the pencils! The red heart of the cedars went for these." The Buckeye and Cork-Wood from the St. Francis River in Missouri and Arkansas said to put them down for reconstruction work. Wooden legs must take the place of those that were lost. But the wise and solemn old owl, when he waked up and heard the discussion, said "Hush!"

"THE Black Walnut will be chosen queen, not by the birds and trees, but by the people and the President of the United States. He sent the Boy Scouts out to mark them and they paid the supreme sacrifice. Their wood went into gun-stocks and every soldier carried a gun. With these they defended themselves and defeated the Hun. And because they were carried into the thick of battle; because they are shell-shocked, gassed and too stricken to say a word for themselves, do you not agree, one and all, that this year, the Black walnut should be made the Queen on Arbor Day?

AND, agreeing, the birds twittered away with the story, "It is fitting that the Black Walnut shall be the Peace Tree for generations to come."

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EDITORIAL

WHAT A FOREST POLICY HAS MEANT TO FRANCE

FRANCE has had a well defined forest policy for over a hundred years. The United States is now beginning to wake up to the fact that one is needed here. What a forest policy has meant to France is indicated in an extract from a letter sent by Leo W. Myers, an American forester in France, to Professor J. W. Toumey, of Yale, which says: "It is only with the acceptance of a rigid forest policy as practised by European countries, wherein the perpetual production stabilizes the prices, that a permanent forest trade can successfully develop along permanent lines. There is no greater concrete example of ecomomic gain in the acceptance of a rigid policy than that of the French forests. The writer, having served as an officer in the American Engineer Corps cutting in the French forests and later making an investigative economic study of European lumber problems, is in a position after more than two years in Europe to realize the lumber conditions. It is with full knowledge of the facts that it is said that France supplied the Allied Armies for five years with construction lumber from the southern pineries, the Pyrenees mountains, the fir and spruce forests of the Jura and Vosges and the hardwood forests of the Midi. France is likewise at the present day supplying lumber in sufficient quantities to take the place of American lumber that, would, under more normal conditions, have been imported. American lumber men should accept the forest policy that begins with the growing seed so that it will insure a permanent production."

TAXING FOREST LAND

FOREST land is, ordinarily, in this country taxed annually the same as any other property. This works a hardship on the timber owner, who gets an income only when the timber is cut. It often forces him to cut before maturity because additional taxes will eat up all his profit. In case the timber is burned, he has a double loss, the loss of his ultimate income and the loss of taxes paid to the State on timber which he never harvests.

The following application of the law in the State of Utah shows where it is unjust and why private individuals cannot hold land for the growing of timber alone: The average assessed valuation of timber lands in Weber county, Utah, is $4.00 per acre. The assessment is 14 mills on the dollar. In 100 years this tax, compounded at 3 per cent annually, amounts to $36.51 per acre, requiring at least twelve thousand board feet per acre (stumpage value of $3.00 per thousand) to meet taxes alone.

The United States is practically the only large nation which has not made reforms in its timber tax laws. Six States—Massachusetts, Connecticut, Vermont, New York, Pennsylvania and Michigan—have made some advance, the Connecticut and Massachusetts laws being by far the best. The latter provides for a ground tax on bare land paid annually, and an income tax, paid when the timber reaches maturity. This law is practically ideal, better even than an income tax alone paid when the timber is cut, since the latter would not protect the public treasury in case an owner held his timber indefinitely for speculative values.

FUTURE FOREST POLICY FOR NEW ENGLAND

FULLY 60 per cent of the land area of New England is forested and this percentage has increased during the last 30 years. In spite of its early settlement and relatively dense population, which is 106 inhabitants per square mile, and for the three southern states 360 per square mile, New England still remains a wooded region.

Forest, waterpower and agricultural lands constitute her principal natural resources. Lumbering, under which wood for pulp is the most important single product, manufacturing, agricultural pursuits and the business built around the summer tourist and sportsman form the four leading industries. These are all interested in the forest resources.

Lumbering is directly dependent upon the forests for

its existence, which is threatened unless forestry be practiced. Under regulated management the lumber industry could draw an inexhaustible supply from the forests.

Manufacturing may secure its raw materials from the forest, or use wood in shipping its products or utilize for power purposes waterpowers dependent for their constancy upon preservation of the forest cover.

Agricultural land throughout most sections of New England is intermixed in relatively small areas with forest land. Under such circumstances agriculture must be combined with forestry in order to realize the highest returns. Thousands of acres of agricultural lands have been left idle because of the exhaustion locally of the forest resource and the consequent departure of the lumbermen who furnish the farmer his market.

The revenue annually derived from fishing, hunting and the summer business reaches a large total and is the chief cash income of many communities. An attractive forest cover is an important item in holding and increasing this business.

When fully appreciative of the part in their prosperity which the forest resource has played, and is capable of playing in the future, the people of New England will demand one of two things—or both—namely:

That the great majority of the forest lands be purchased and managed by the federal or state governments; or, that such restrictions be placed upon private owners of forest lands as will, while utilizing, perpetuate the forest resources.

FOREST INVESTIGATIONS NECESSARY

EVERY state is concerned in and affected by the endenavor to establish more forest experiment stations. These stations will make it possible to secure information by forest investigations, which will result in increasing the timber production on forest lands. Congress has been asked for appropriations to establish such stations in New Hampshire, North Carolina, Florida, Minnesota and California. These are not alone for the benefit of the states in which they are to be located if the appropriations are granted, but for all the states near them. This phase of the situation is commented upon by the Lowell, Massachusetts, *Sun* which, after commending the association's efforts for the establishment of a forest experiment station in the White Mountain National Forest says: "But it is important that such an experiment should help Massachusetts and Rhode Island as well as New Hampshire. There is a vast extent of waste land that might profitably be used for raising timber. At present, it is left to Nature to raise her own crop without any assistance. The young trees from seeds blown by the wind are not always the kind that will produce the best lumber or the best woodpulp. Give us the experiment station to show us how to restore our vanishing forests and to supply lumber enough to meet our needs of construction."

NEWSPAPER EDITORIALS ON FORESTRY

IN the working out of the campaign for a forest policy which shall result in a definite program for perpetuating our forests the American Forestry Association has found editors of newspapers keenly alive to the importance of the movement. They have been most liberal in giving space in their news columns and feature pages and have followed such publicity by forceful editorial utterances. Among the recent editorials is a notable one in the *Providence (R. I.) Journal* which says:

There is an appealing sentiment in the plan of the American Forestry Association for planting American trees on the battlefields of France in memory of the American soldiers who lost their lives in the war with Germany, and official acceptance of the offer by the French Government insures the carrying out of one of the finest memorials yet proposed. The plan is unusual in that it has a practical value; the devastated parts of France are greatly in need of reforestation, and aid from America will facilitate the work of preparing the damage done by the armies of the invaders in the regions of the Aisne, the Oise, the Ardennes and the Somme. France always has taken the best of care of her forests, but the war-time spoilation of its timber has subjected the country to a loss that can hardly be calculated. Any aid extended now is doubly valuable—no time should be lost in sending oak, ash, poplar, fir and other American trees to France.

This memorial, besides bringing the French and American peoples into closer relations, should revive interest in the subject of reforestation in the United States. Much can be learned from the operations of the forestry department of France, particularly in the line of providing an uninterrupted supply of timber. The operations of American lumbermen so far as the future is concerned have been hardly less destructive than that of the German armies in France. America has vast areas suitable for the cultivation of timber; what is needed is the cooperation of Federal and State Governments and the owners of the land. When timber is regarded as a crop there will be no scarcity of lumber. The shortage here is the result of failure to profit by the centuries of experience of the nations of Europe in setting out new trees wherever the mature growth was cut for the market. It may be added that there are opportunities for memorial forests in the United States as well as in France.

FARM WOODLANDS AN ASSET

FARM owners are slowly waking to the fact that their woodlands are an asset instead of a liability. Their 200,000,000 acres—well on to 40 per cent of the total timbered area of the United States today—must be made to do their part by adding to their owner's income, and our country's wealth.

What do owners desire of their woodlands?

Many are looking at the æsthetic side and are beginning to realize the extent to which woodland adds to the beauty of the farming country, and to the desirability of country living. To a very considerable extent, these owners—and their neighbors— can "eat their cake, and have it, too," for the forester can show them how to harvest their timber crop, and yet preserve the external general appearance of the piece of woodland.

A large number appreciate as never before the relation between the permanence of springs and streams and the presence of a woodland cover. But here again the forester can help the farmer by showing him how he may cut his timber crop and yet protect the water resources of his farm.

The shelterbelt or windbreak of mid-western farms is well recognized as a highly desirable feature and in many cases, as essential to the farmer's proper development. But farmers of other parts of the country as well place a high value on the protection against the wind furnished by their woodlands. All such can and should call on the forester to show them how they may harvest the timber crop, and yet continue to enjoy the greatest measure of protection.

Other farm owners may desire a cover for small game or a cover to prevent erosion with its ruinous effects upon lower-lying lands. The assistance which can be rendered the farm owner in this connection is obvious.

And last, but not least, comes the farm owner's production of timber, maple sugar, or some other forest product, for his own needs or for sale. He need only inquire the retail price of very ordinary lumber today to learn that there is money in it for some one. Practically all forest products are selling well. The growing of timber for sale or use is a coming business.

In connection with this whole question it appears that—

The treatment given by the farmer to his woodland affects the well-being of the country.

Only a small percentage of farm woodland owners today realize what possibilities exist in their woodlands.

Farm woodland owners will sooner or later be expected by the general public to so manage their lands that they can actually contribute to the country's forest products.

The farm woodland owner should look to the federal government and the state government to provide the necessary technical assistance. The machinery now exists in the Smith-Lever Act. Funds and technical assistance will be forthcoming when woodland owners in great enough numbers make their needs known through their County Farm Bureaus.

SOME TERRIFIC FACTS ABOUT FOREST DEVASTATION

UNDER the above headline the Birmingham, Alabama, *News* has a forceful editorial based upon information sent out by the publicity department of the American Forestry Association to the newspapers of the United States in the campaign to secure a national forest policy. Like most wide-awake editors, the editor of the *News* realizes the vital need for perpetuating our forests. In his editorial he says:

"The American Forestry Association calls attention to the fact that the forest fires in this country burn ten times the area of devastated France every year. Using that terrific fact as a text, Charles Lathrop Pack, president of the Association, preaches a powerful sermon on the imperative need for a national forest policy.

"He explains why the penny newspaper and the two-penny newspaper are things of the past. He sees in the gradual depletion of American forestry an actual menace to education. Some of his recent utterances are alarming, and the data, carefully gathered, confirm the opinion rapidly spreading that unless the United States buckles down to forest conservation, not only will newsprint become higher, but agriculture must inevitably suffer.

"Increase in the use of newsprint has been 200 per cent in twenty years, and the population has increased 70 per cent. That means a great reading public and a more widely reading public. Ten years ago, President Pack points out, the United States produced its entire supply of pulp wood, but now two-thirds of it is imported. This means freight rates to be added to the purchase price. Here are some of the points touching the problem as tabulated by the American Forestry Association.

"The use of pulp wood in the manufacture of newsprint paper has been developed only in the last 50 years. Of all the paper used in the United States 22 per cent is used by the newspapers.

"Before the war newsprint paper sold for about 2 cents a pound; now it sells in large quantities for 5 cents a pound, and in small quantities up to 10 cents a pound.

"Dependence upon foreign supplies of pulpwood for newsprint means that we will be at the mercy of foreign manufacturers as to prices.

"All exports of pulpwood for Newfoundland and from the crown lands in Canada have been prohibited.

"But the conservation of timber for newsprint purposes is even less important than the conservation of forestry for the making of homes for human beings to live in. And while the Forestry Association states that most of the pulpwood for newsprint is obtained from New England and the Lake States, there seems no reason whatever for the Southern States further to neglect this opportunity for creating a great new and profitable industry."

CALIFORNIA FORESTS AND FORESTRY

BY T. D. WOODBURY

ASSISTANT DISTRICT FORESTER, SAN FRANCISCO, CALIFORNIA

THE outstanding characteristics of California forests is individuality. The monarch Bigtree (*sequoia washingtoniana*) once, without doubt, widely distributed, has found its sole suitable sanctuary in the protected recesses of the Sierra Nevada. Here, and here only, has this giant been able to win a permanent victory over inclement nature. The deformed and fire-scarred trunks of individuals of this species furnish a unique record of a two thousand year struggle for existence, the scientific study of which has opened a new page in climatological history.

The little big brother of the Bigtree—the commercial redwood (*sequoia sempervirens*) has found our fog-belt, a narrow zone about twenty-five miles wide along the shores of the Pacific from the Oregon line to Monterey Bay, to its liking, and is of no importance outside of this territory.

Sugar pine (*pinus lambertiana*), that Pacific Coast aristocrat of the genus, has found only in California conditions suitable for maximum development, although it has wandered feebly across the state line into inhospitable territory in a few localities. This sturdy tree, clean and symmetrical, lends distinction and distinctiveness to our forests, throughout the whole length of the state, bringing joy alike to nature lovers because of its beauty and to lumbermen because of its high quality, which has a very pleasing effect on the bank balance.

Incense cedar (*libocedrus decurrens*) the coming wood for pencil manufacture, is also a "native son." While not as impressive as either the Bigtree or sugar pine, its wide distribution and enhancing value have secured for it a permanent and increasingly important position in the forests of this state.

Several tree species of less commercial significance also exhibit the same fondness for California. Among these is the Monterey pine (*pinus radiata*) which confines itself to a very restricted territory on Monterey Bay, and that dwarfed, gnarled tree recluse, the Torrey pine (*pinus torreyana*). The few sole survivors of this latter species are to be found on the coast near San Diego, where they are waging a losing fight with the winds of the Pacific.



GROUP OF SUGAR PINES, SIERRA NATIONAL FOREST, CALIFORNIA

The commercial, or merchantable forests of California cover about twenty million acres, or roughly, one-fifth of the total area. There are three rather broad, distinct forest regions, the Sierra Nevada Mountain Range, which skirts the two large central valleys of the state on their eastern edge, the northern coast range, which embraces the forested portion of the coast range from Lake County through Trinity and Siskiyou Counties northward to the Oregon line and the Redwood belt, which lies between the coast range and the Pacific Ocean from Monterey Bay to above Crescent City.

In the Sierra Nevada belt, sugar and western yellow pine predominate in mixture with the Douglas, white and California red firs and incense cedar. On the eastern slope of these mountains sugar pine is much less abundant than on the western slope and

jeffrey pine replaces yellow pine to a considerable extent.

The Northern Coast Range forests are distinguished from those of the Sierra Nevada by the larger percentage of Douglas fir in the mixed stands and by large pure stands of this species.

The redwood belt is composed of practically pure redwood, although in some localities the Douglas fir in mixture is of considerable importance.

These three regions contain at present approximately three hundred million feet of merchantable timber, about



SUGAR PINE BURNED OUT AT BASE, SHOWING FRESH DIRT THROWN IN TO PREVENT FUTURE FIRES FROM REACHING BURN

one-third governmentally owned and largely within eighteen National Forests. Of the remaining two-thirds in private ownership about 65 per cent is within the pine belt and the remainder is redwood. There is no redwood, commercially speaking, within the National Forests. It is all privately owned.

During recent years the annual cut of California mills has ranged around one and a quarter billion feet, less than eight per cent of which has been derived from the National Forests. On this basis it might appear to one unfamiliar with the tendencies in the lumber industry that the virgin timber in this state would not be exhausted for at least two centuries. However, it can readily be shown that such is not the case.

It has been stated on good authority that the southern pine region, which has for many years supplied a large part of the lumber demand in the central west and in the east, will be exhausted within twelve years and that seventy-five per cent of the mills in that region will be cut out within seven years. California has the only other large remaining supply of pine. It is therefore natural to suppose that the pine operators of the south will be attracted toward California forests. Several recent stumpage transactions tend to give color to this belief. In addition, owners of tracts of forest land that have long lain dormant are also indicating activity and established mill operators are making vigorous efforts to increase their output. It is therefore anticipated that the cut from California forests will double within five years and treble within eight years. One of the largest operators in the state has predicted an even more rapid rate of cutting. It appears probable that the virgin forests of the state will be substantially cut over within the next fifty to sixty years.

Now while sixty years is an ample period for organizing and regulating a human community, it is much less



SHOWING THE AREA AND THE DAMAGE DONE BY THE MARSH FIRE. PLUMAS NATIONAL FOREST, CALIFORNIA

than a generation in a forest community. Causes follow effects just as inexorably in one as in the other however, and "reform waves" are occasionally necessary and helpful in both. The civic reformer usually lives to see his theories tested, proven, modified or discarded, while the forest reformer, fortunately or not, rarely has this satisfaction. It seems to follow logically that the forester has the more difficult task and, since they cannot be quickly and effectively modified, should test his theories more carefully before applying them.

Marked progress in all lines of endeavor appears to

be periodic rather than continuous. General interest in forest problems is quickening in California as well as elsewhere. A forest "reform wave" is in the making. Many are asking the questions: "Is the forested area of our country being managed so as to ensure us an adequate perpetual supply of timber?" "If not, what action is necessary in order to accomplish this?" Our President is asking this question. My reply for California is emphatically "No" to the first question, and to the second, "Better protection and regulation." These replies are too brief and too stereotyped to convey much meaning without further explanation.

We have seen that about two-thirds of the timber in the state is in private hands and that ninety-two per cent of the cut is derived from private holdings. It is therefore clear that at present the public is much more



STAND OF YELLOW PINE AFTER COMPLETION OF LOGGING OPERATIONS. STANISLAUS NATIONAL FOREST, CALIFORNIA

vitally interested in the methods employed by private operators than in those used on the National Forests. The National Forest practice may be described briefly.

The timber cut is closely utilized. Refuse is piled and burned. Dead and diseased trees are felled to reduce fire danger and prevent infection. The immature trees, which usually make up about twenty per cent of the stand over twelve inches in diameter at breast height, are reserved and a reasonable degree of care is exercised to protect these young trees, as well as the smaller growth, from logging injury. These measures tend to improve the forest.

In the main, satisfactory reproduction of valuable species is being secured on cut-over areas within the National Forests and the prospects for a second cut of from 5M to 15M per acre within fifty to seventy-five years are excellent, provided fire is kept out. The fire hazard is excessive on areas where logging is going on. This is due to the use of locomotives and steam machin-



LARGE YELLOW PINE 80 INCHES IN DIAMETER. SIERRA NATIONAL FOREST, CALIFORNIA

ery and all too frequently the practices outlined above are nullified by fire. More money which would enable the Forest Service to secure adequate modern equipment and adequate trained forces of men, is seriously needed. Equally necessary is the attainment and standardization of successful fire fighting technique. The Forest Service has been strangely slow in initiating scientific studies of fire protection and suppression problems, but such studies are now underway, and give great future promise.

Since the lumberman's object is to convert trees into boards as economically as possible, and since the above outlined forestry practices add about 80 cents per M to operating costs, it is not surprising that we do not find them widely prevalent on privately owned land. The increasing demand for California forest products has, however, stimulated close utilization, and in this respect just now, there is but little difference between the lumberman's and the forester's methods. Stumps are generally 24 inches or less in height and tops are closely utilized. The white fir and cedar in mixed

stands, which but a few years ago could not be logged at a profit and were therefore frequently left, are now being generally taken out of the woods with the other species.

When we pass beyond the utilization phase, however, we quickly find the lumberman and the forester separating to follow widely diverging roads in the practice of harvesting the forest crop. Ninety per cent of the timber in California must be logged with steam machinery because of the rough character of the ground surface. This type of logging, even when regulated by the use of blocks, shear logs, and well planned logways which are the practices followed on public land, is very destructive to young growth. On private land, where no regulation whatever is practiced, it is often disastrous. Economy demands that when a log has been started for the landing it should get there without delay en route. When a 12 x 14 donkey engine grabs a big sugar pine butt log with a heavy wire cable, it is surprising to see how quickly even trees 24 inches or more in diameter yield a right-of-way. Is it to be wondered, therefore, that on the average private logging job the few young trees below profitable cutting size and the reproduction are left, after their contest with steam machinery, in about the same condition as Kansas wheat after a cyclone? The forester's basis for a second cut in fifty years is conspicuous by its absence. This is description, not criticism. Everyone admits that, from a public standpoint, such conditions are unfortunate. Criticism will not improve these conditions. When the public gets ready to pay for improvement in methods, either directly or indirectly, the methods will be improved—not before. The cost will not be great and the dividends will be large.



BULL PINES AND MILLED AREA, SHOWING LACK OF SEED TREES. ANGELES NATIONAL FOREST, CALIFORNIA

Adequate fire protection of all strictly forest land has rightly been an important part of the creed of California foresters. By "adequate fire protection" I mean a brand of protection in which every effort is exerted to keep all forms of fire out of true forest areas—the kind we are attempting to apply to National Forest lands in California. Lumbermen and timberland owners hold divergent views regarding fire protection. A few do not consider any form of protection worth while, a few really subscribe to the Forest Service practice. More pretend to. The majority, however, are believers in some form of controlled burning.



SHOWING HOW FIRE GOT AWAY FROM DONKEY ENGINE IN CUT-OVER FOREST. STANDING TIMBER, WHITE FIR, ALL KILLED. SIERRA NATIONAL FOREST, CALIFORNIA

The lumberman's lack of interest in complete forest protection is attributable to three principal factors: the damage done to the merchantable timber by a typical California forest fire is not spectacular; the young growth which is largely destroyed by the typical fire and typical logging method is not marketable; the young

growth increases the fire hazard in virgin stands.

California timber stands are not dense as a rule. Top fires, which destroy the mature trees over a considerable area, are therefore rare. The damage done by fire generally consists in the burning down of an occasional tree and the scarring of others. This damage is not impressive, although by a careful study of representative areas the Forest Service has shown that it amounts to about $2.50 per acre—really a material drain on the forests.

Broadly speaking, cut over lands in California are only salable for grazing purposes at present. Young timber decreases the grazing capacity of an area and therefore detracts from its sale value in the eyes of present purchasers. Areas of virgin timber also produce revenue from grazing and here again the young timber growth fills up the grassy openings in the forest and is a detriment from the grazer's viewpoint.



TIMBER SALE AREA IN PLUMAS NATIONAL FOREST, CALIFORNIA. ALL MARKED TIMBER CUT—SUGAR AND YELLOW PINE RESERVED

Foresters are compelled to admit that the young growth in a virgin forest and on cut-over lands increases the fire hazard for a time, but if the public accepts the viewpoint that this is a sufficient reason for countenancing the burning of this young growth, our national forestry program will receive a severe setback. Practical observers contend that young growth in a forest has no value because it becomes so suppressed by the shade that it cannot recover when freed. Foresters have proven that this is not the case. We know from careful studies that in an open pine forest a large part of the young growth recovers its full growing power within three years after the removal of the mature timber and that the presence of young trees well distributed on a cut-over area assures a continuous forest cover and decreases our cutting rotation from ten to thirty years—the usual length of time required to secure satisfactory natural reproduction from seed trees after cutting.

California lumbermen, then, not appreciating the inconspicuous damage done to mature timber by forest ground fires and regarding the young growth in the forest only as a menace to the mature timber, are very much inclined to regard such fires with complaisance.

The public problem is to change this attitude in order to secure maximum continuous forest productivity.

About 40,000 acres of private timberland are being cut over every year in the state. Through inability to capitalize the forest values remaining after cutting, these values are being depreciated greatly by fire and destructive logging methods. In my opinion this condition should be remedied by federal legislation requiring timber operators to protect young growth both from the effect of destructive logging and from fire to a reasonable degree. The small expense involved in this should be regarded as a legitimate part of operating cost. This increased expenditure would naturally be reflected then in a corresponding increase in selling price and the beneficiaries, the consuming public, would pay the bill. This is as it should be, it seems to me. Without blanket federal legislation, I see no way in which this needed protection can be secured for the country as a whole. It is also desirable that all lumbermen should be placed on the same competitive basis which can only be accomplished by national, rather than local, regulation.

Legislation which would enable the government to acquire private cut-over lands would promote the protection of young growth on such lands, provided the public officials charged with their appraisal based their valuation quite largely upon the condition of these areas. Such action, however, would only be a partial remedy

for present unsatisfactory conditions. Two-thirds of the timber in California is in private hands and is being cut without regulation. The state now has a population of about three million people which consumes about three billion feet of lumber annually, or about one thousand feet board measure per person. A careful study of the subject indicates a population of over seven million in 1969, by which time the private forests will have been largely cut-over, and will not yet have produced a second crop of merchantable timber, thus increasing the drain on the public forests. Statistics from the more thickly settled regions of Europe show a decrease in lumber consumption as the supply diminishes and the population increases. California, however, is and will continue to be a great fruit producing state. Fruit producers must have box lumber. The citrus industry alone now requires about 150 million feet of box lumber annually. It is not likely, therefore, that the per capita consumption of lumber will fall below 300 feet during the next fifty years. In 1969 then, California will require at least two billion feet of lumber a year, which it will be necessary and desirable to furnish largely from the nearest available source—the National Forests. Calculating an annual per acre growth of 300 feet, which from past studies appears conservative, the nine million acres of forest land within the National Forests should be capable of meeting this demand and supplying over half a billion feet for export.

While it is conceded that the distribution of the cut from the National Forests of this state will undoubtedly be governed in the future largely by economic laws and that these forests must be regulated for the benefit of both the state and nation, it seems clear that it would be wise and farsighted for organized local agricultural interests to take steps to supply their lumber needs from the nearby National Forests. Such tendencies are in evidence and the first steps in forest regulation that are now being taken here are predicted on the belief that the public forests should meet such local needs continuously insofar as is consistent with national welfare.

A working plan for an area of about 350,000 acres of forest land in the northeastern part of the state is now being prepared. It is our hope that it will be possible to manage this forest on a continuous sustained yield basis after a portion of the surplus growing stock has been removed, and that the regulation of this forest will contribute toward maintaining the stability of the citrus industry.

A basic fundamental study of state-wide present and future conditions of population, timber supplies, lumber movements, transportation routes, agricultural development and lumber consumption, is well underway. As a result of this study, we hope to be able to detect the National Forest areas where the future increased demand for forest products will first be felt. This much accomplished, these areas will be intensively studied and the form of forest management will be introduced which promises to contribute most toward both local and national continued prosperity.

WASHINGTON'S SICK SYCAMORES

THOUGH now distinctly on the sick list, and looking pitiable, indeed, as if they had been transplanted from one of the shell-torn battlefields of France, the big sycamores on Eleventh Street, Washington, D. C., are confidently expected to make a splendid recovery and a beautiful showing by the late fall, and next year they will be better than ever before. This is the expert opinion of Mr. Clifford Lanham, the Superintendent of City Trees of Washington, and he has good reason for his confidence, because of his experience with trees similarly treated in previous years. As Mr. Lanham says, the sycamore, or buttonwood, as it is often called,



SYCAMORES UNDER TREATMENT

Eleventh Street, in Washington, is lined with sycamores, now presenting a weird and ghastly appearance, causing much comment. They are diseased and have been pruned and treated scientifically, and their ultimate recovery is confidently expected by city tree authorities.

will recuperate from the most severe treatment, and the pruning which has been done was absolutely necessary in order to rid the trees of the sycamore louse, and also a slight infection of the oyster-shell scale. The insect occurs principally on the far ends of the branches, on the youngest growth, and it will succumb only to the strongest chemical spray. This spray causes a chemical change when brought in contact with white lead, so it was impossible to treat the trees properly without ruining the paint of the houses in the vicinity, and this also argued in favor of the final decision to prune severely. It will be interesting to watch the development of the new growth during the summer, to see these starkly naked limbs cover themselves with tender green.

RECREATION IN THE FORESTS

BY ARTHUR H. CARHART

RECREATION ENGINEER, U. S. FOREST SERVICE

RECREATION is necessary to human life. An individual cannot concentrate on one thing continuously and do the best work. Continued work in one field without change produces mental stagnation. In order to take place in the strenuous contest of life the individual must of necessity "recreate" himself through recreation.

Recreation may be had in many fields. A movie will serve as recreation for some individuals and may, in fact, represent the bulk of such play which they can secure. Dancing is a recreation which can do much good. And there are many other forms of recreation sold daily for coin of the land because people must have change of interest. But the best field in which to seek recreation is in the great free fields of God's world. The plains, streams, hills, mountains, lakes, forests and valleys offer a form of recreation that surpasses any to be found where play is corralled within narrow walls and sold at so much per unit.

Recreation in the open is of the finest grade. The moral benefits are all positive. The individual with any soul cannot live long in the presence of towering mountains or sweeping plains without getting a little of the high moral standard of Nature infused into his being. In the open the physical being cannot but benefit. In the dusty dance hall, or in the crowded theatre there may be lurking the germs of a virulent disease, but in the fresh air of the outdoors there are naught but rosy cheeks, keen appetites and a vigor that takes its place along with the sturdiness of strong old oaks. The mind snaps into a livelier gait of thinking, the new scenes bring new thoughts and one must think of the many new things that call for attention. With eyes opened, the great story of the Earth's forming the history of a tree, the life of a flower or the activities of some small animal will all unfold themselves to the recreationist. Mental processes thus impulsed are a thousand times more constructive than can be found in many marts of recreation that live in the cities. Recreation is necessary and when taken outdoors the moral, physical and mental benefits derived are many times greater in value than can be found in the artificial man-made recreation.

Years ago there could easily be found open country where one could play, picnic, tramp or camp at almost any turn of the road. A few years ago by going a small distance camping places, where nature was still supreme, could be found. But today, with man land-hungry, these places are fast disappearing. Economic use of land for the production of crops changes the fact of the landscape and there remains little of the free natural country for which the vacationist longs. This movement of subduing nature could continue to a point where there would not be left any lands where one might see nature supreme. Where then can nature find sanctuary and where can man needing the rest that is to be found only in the open fields expect in the future to recreate out of doors?



SWEETWATER LAKE ON THE WHITE RIVER NATIONAL FOREST.

Few mountain lakes offer a great amount of good boating, but this scenic sheet of water is very popular for boating. Back of the cliff shown is a waterfall, a small gorge and a cave that has never been thoroughly explored. A vacation on the shores of this lake would offer delightful recreational opportunities.

The answer lies in the movement that is making itself manifest throughout the nation today in the creation of large rural park systems. In county parks, in state parks, in the National Parks of the country will be found the refuge of the natural landscape and the place in which the city-tired human may be healed mentally, physical and spiritually. But, besides these, the greatest reservoir of recreative lands that exist today in the United States will be found and will always be found in the National Forests.

Primarily, forests are considered great areas to produce timber. There are other utilities that can be realized on coincident with the growth of timber and may in reality either depend on a good forest cover or will aid in the production of timber. In the past the grazing lands in the National Forests have produced quantities of market beef. Today there are more cattle grazing on

the National Forests than ever before because of good range management. Watershed protection depends directly on good forest cover, and the better the cover is maintained the better will be the watershed. Both of these do not in the least interfere with timber growth when properly directed. And what is true in the National Forests, also is true in the State, county and municipal forests that are springing up over the country.

Recreation is a third utility of the forest that can be fully developed without any serious interference with the other forest activities. It does not interfere with timber production and, indeed, a good forest cover is one of the very necessary elements in the landscape



CASS LAKE, IN THE MINNESOTA NATIONAL FOREST

Taken from one of the "points of Star Island," few places can truly rival the delightful lake scenery and the opportunity for water sports offered by the forests of Minnesota. Fishing, game, motoring, canoeing, bathing—solid enjoyment of nature may be had.

which makes recreation pleasant in a certain locality. Fire, the demon enemy of timber, is as great an enemy of the recreationist, for the great scars which fire leaves on the face of the hills destroy some of the greatest charm found there.

In the case of watersheds, there are today several instances where camps have been developed right on the watershed of some municipal water supplies. The reason for this is, if there is no provision made for campers there are some who will invade the territory anyway, and it is safer to see that sanitary measures are practiced efficiently by many than not at all by a few. And in the regions where the watershed is maintained and protected for irrigation purposes the big item is the protection of the timber, and timber is one of the beauties of a recreation land.



A NEWLY BUILT SUMMER HOME ON THE COLORADO

Many snug little summer homes similar to this are built on the National Forests. That such places are appreciated is evidenced by the fine returns from such use of the forests.

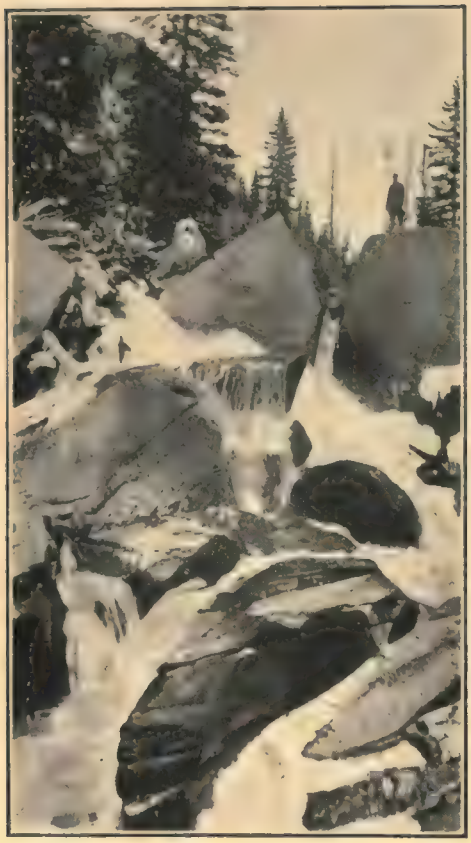
Only in very limited areas is there a conflict between grazing and human occupancy of forest lands. Where



CATCH FROM A LAKE IN THE ROUTT NATIONAL FOREST

Catching fish is a form of recreation which may be indulged in in nearly every National Forest.

people live or camp it is undesirable to have cattle in the immediate vicinity. It is a case of whether a few acres shall be used by cattle or by humans, and because the human use is undoubtedly a higher use than bovine use it is necessary to exclude the cattle during human occupancy. It is entirely possible, however, where this measure is taken to allow late grazing in the area and



BEAUTY UNHERALDED BY FAME

Great tumbled rocks and water always make a pleasing landscape composition when Nature is the artist.

thus realize on all of the good forage that can be found. There are points where some individual cattle man will be inconvenienced by this arrangement. There have been many cases already where some disgruntled individual has objected to the use of his cattle range by a number of humans, and there are instances where the cattle man has been so vociferous in his crying over what he considers an injustice to his steers that he has made himself heard by large groups. But happily in the majority of the cases where the recreational use has been introduced along with grazing in the forests the cattle men have recognized that play in forests had come to stay and were glad that there could be proper planning to localize and direct the use to the greatest advantage to both of the forest resources.

There never will be a great interference between recreation and grazing in forests. There will be so slight a reduction in cattle grazed on certain areas set aside for human use that no effect will be felt at any point in the nation's supply of beef. And because several people can enjoy a whole summer's residence on a piece of forest ground that would not begin to graze one hungry steer and because the health of the nation depends as much on recreation out of doors as it does on steaks indoors it is probable that the human use will remain the preferred one in certain localities. But in considering this slight conflict of uses it should be remembered at all times that the reduction in beef production through utilization of the forest as a recreation grounds is almost so slight as to be unestimable.

Mining dumps on the landscape are often unsightly. No recreationist would care to have a summer home that looked on a hillside pitted with prospect holes. And power development should often legitimately steal from the beauty of a waterfall. But in each of these cases the economic return is so intensive from the small extent area, the number of places where such use can be made of grounds is so limited there is no question but what there should be all preference given the strictly commercial side of the development of either mining or power. But this statement is not applicable to the wanton destruction of natural beauty through misguided enterprise that tries to develop water power from a dainty little fall that would never turn a wheel of sufficient size to merit its destruction, nor where mining claims are staked merely to secure title to land for use other than mining.



JEWEL IN A SETTING OF SOFT GREEN

Colorado's National Forests offer many such haunts of sheer beauty.

So it will be seen in reviewing the relationships here discussed that the recreational use of the forest is almost an added one. It is a realization on the collective investment of the people in the forests that gives a great aggregate return to them on that investment and in no appreciable measure does it interfere with the economic use of the forest. It is the forest's most direct return to its owners, the public.

Public health should stand before every other consideration in a community. And public health should not include alone a consideration of bodily condition, but should consider the mental



WINTER SPORTS IN THE ROCKIES

The Rocky Mountains offer opportunities for winter sports equal in every way to those found in any other region. Here a ski party is seen near the Continental Divide in the scenic highlands of the Colorado National Forest.



A TENT CAMP IN THE SHOSHONE NATIONAL FOREST

Scores of these residential units are springing up in the Forests everywhere.

health as well. Recreation of excellent grade is necessary in maintaining both. Recreation can become one of the greatest returns from the forests of our country. And because it is a human use, producing mental and physical health, the recreational use of forest land will always take place among the highest of all uses.

There are today over 150,000,000 acres of National Forests in the United States, and the future will see many acres of forest land now privately owned transferred to the hands of the State, county or town. The recreational reserve in these lands is by far the greatest known. Perhaps the next largest recreational land group in the world is our own National Parks of the United States. But they represent less than one-twentieth of the territory in the National Forests alone, and if all other forest lands were included the ratio would be even more astounding. It is to the great forest lands of the nation that the people will ultimately have to turn to find the outdoor recreation that they crave. And it is foolish not to realize on this great utility of the forests, for it is a return added to the economic uses now established without any detraction from their value. While the recreation feature cannot be so accurately measured and tabulated as the others because they always have an established market where money figures are quoted, the recreation return from forest lands will annually amount to many million dollars and the return in good health, better, keener thinking and enjoyment of the æsthetic qualities found in the forest will add wealth to the nation that cannot be accurately estimated.

It would seem that this utility is almost unlimited. But the nation at one time thought the farm lands of the Middle West so great in extent that they would never be fully developed. Time and again this idea of a resource being inexhaustible has gone glimmering when the limits of that resource came glaringly to light. And so it will be in the case of the recreational resource of the forests unless they are rightfully planned. One misplaced cabin in a forest, one illy planned camp can affect the recreational use of a whole region to such an extent that people will go to less desirable places where the planning is good.

Recently the United States Forest Service has stepped in the right direction. The technical training of the man that is to plan forest areas for recreation should receive as much consideration as the case of the man who handles the law cases in forests, or the grazing man, or the mine expert, or the forester in silviculture. The courses in school that best fits the man for this work is landscape architecture. It is not the perfect course for such a man, but it is the best by far that is available. And the requirements of a recreational engineer of the Forest Service is that the man must hold a degree in some landscape course of a recognized school.



A LOVELY SPOT IN MOUNTAINOUS COUNTRY

Forests in the mountain land of the Western States contain multitudes of little lakes such as this.

Recreation is now taking its place in forest activities. It is an added return from forest areas to the people of the community or nation. It is an essential part of the life of the nation and the greatest resource of recreational territory of the country is found in the forests. In the future there will be even a greater area available for such use. The Forest Service is today blazing the way in recreational development of the forests, and there is every reason to be hopeful of the results, for, as in all fields, the Forest Service is picking men with the proper training to handle the work.



HIKERS ON THE SHOSHONE

Dressed appropriately, in "rough and ready," the Prairie Club of Chicago is all ready to start on an all-day hike.

Modestly and efficiently recreation is becoming a part of the regular activities of the forests. It is right that it should be recognized as a major forest utility. The future will more forcibly demonstrate this fact than can the present. But the present is bright and the future holds good promise for this great forest utility which, while not actually a new use of forests, is but now being generally recognized, efficiently organized and properly planned.

AMONG THE TRILLIUMS

BY BESSIE L. PUTNAM

FEW of our native plants are more beautiful, and while the haunts of the trillium are for the most part in deep woods, it seems readily to adapt itself to cultivation. We have during the past few years, when asked by distant flower lovers for the flowers, sent the entire plant rather than cut flowers. Since the blossoms cannot be gathered to advantage without taking the whorl of green leaves a couple of inches below, and since these leaves cannot be renewed it is better to take the root with them, and thus enable the admirer to plant them in the garden, where they may be renewed and readmired year after year.

The trillium is one of the May blossoms of Northwestern Pennsylvania, and *T. grandiflorum* is by far the most common species, growing almost equally well on the rich hillsides and bordering the brook. Recently we saw it in abudance on a steep hill bordering the upper Allegheny, the pure white blossoms appearing to the best possible advantage against a background of hemlocks. This species varies greatly in size, the two extremes being often found growing side by side, and the best specimens are nearly twice as large as either of the other species with which the writer is acquainted. The petals turn pink with age. It also bears evidence of the close relationship between leaves and flowers, the petals often reverting to the foliaceous form.

T. erectum is less frequent, following more closely the streams and moist places. The flowers are of a dull red, New England Blossoms," mentions the fact that they are visited by a common carrion-fly, which evidently aids in the problem of cross-fertilization. While *T. grandiflorum* is probably fertilized by insects, they are certainly not attracted by any blossoms of lurid flesh color nor by a putrid odor. The pure white flowers are nearly odorless and have no suggestion that would tempt the olfactories of the carrion-loving insect.

Matthews states that *T. erectum* is poisonous, as an acquaintance found when mistaking the root for that of Indian turnip. There are variations in color, sometimes the flowers being pink, greenish or white. The writer has found cream colored specimens, the peculiarity of the ovary leaving no doubt as to the species of which it is a freak.

We have heard of *T. erythrocarpum,* the beautiful Painted Trillium near Meadville, Pennsylvania, but never had the good fortune to see it until last May, when visiting a "rock city" near Tidioute. There, at the base of one of the great sandstone cliffs, forty feet or more high, with seemingly only the disintegrating rocks for sustenance, we found three beautiful blossoms, the crimson markings in the center well entitling the plant to its name. One root was carefully taken up and placed on the north side of the house, where the sandy soil with the sandstone of the cellar wall for a background seem to supply all necessary conditions of its native rock city. If it adapts itself as readily as its sisters, it certainly will

NATURE STUDIES IN SMALL AREAS

BY DR. R. W. SHUFELDT, C. M. Z. S.

PHOTOGRAPHS BY THE AUTHOR

IT WAS the great American naturalist, Louis Agassiz, who said that a man might spend the three score years and ten of his life-span on a square mile in the unexplored part of a Brazilian forest; work every day and all day at the natural history of the various living animals found in such an area, and at the end of that time he would be a long way from having it described and illustrated. No truer statement was ever made; and it may be added that were that man to undertake to describe the anatomy and physiology of all those forms, a thousand years would not suffice in which to complete the task. Indeed, this Agassizian axiom might apply, with equal pertinence, to an area of one-fourth of the extent named, and the territory be selected in some heavily timbered and rarely frequented part of the eastern states. To partly demonstrate this, we may select the animals collected and the observations made on a trip through the timber, undertaken early in May, in a stretch of woods next to a river near the Atlantic coast somewhere between Massachusetts and South Carolina. The land is gently rolling, well watered with springs, small streams, and some marshy places, while most of it supports a fine second growth of timber, consisting principally of various species of oaks, pines, cedars, poplars, and a few other kinds. Not many flowers are in bloom there at this season, although the cowslips were well advanced during the first week in April, while but a little later the Dutchman's breeches were already going to seed.



GROUP OF DEAD OAK TREES

Fig. 1. In most cases, the bark may easily be torn off in sheets, exposing the ravages of the borers. Some of the trees have fallen to the ground and on many of them the bark is entirely absent.

Still, on this May morning in these woods, the trees are all in full leaf, and the blossoms of the poplars have already passed. Standing among the second growth stock, we note here and there an enormous oak which probably was a fair-sized tree in Revolutionary days.

Some of the pine trees and poplars, too, were, in their way, giants among trees, lifting their heads far above those of a later growth about them.

In a marshy place covering several acres may be seen some thirty or forty oaks of all sizes—two or three of them being of immense proportions, while others fall in the second-growth class; half a dozen pine trees are found in the same area. For the most part every one of these trees are dead; the tops only of others are dead, while in some instances the tree has fallen, and is either stretched in the mire or leaning against another dead one of the group. We find the bark of many of those that have long been dead entirely removed—in others it may be readily detached in great sheets by a slight pull; and in most instances beneath it is found all the evidence of the ravages of either ants or certain beetle borers and their larvæ. Their borings riddle the trunk of the tree from top to bottom, and the wood is very friable, soft, and rotten, the main galleries being, in many places, choked with fine wood dust, in evidence of the mischief they have done the tree.

Other beetles of a dull black color are also present, but these must not be confounded with another met with under logs and stones on the ground, specimens of which were also collected on that May day. The ones found under the bark of the trees are here shown in Figure 3, natural size—four of them—photographed from life. The smaller specimen, up in the right hand corner, is also found under the bark; it is orange-yellow, with a blackish head and pincer-like mandibles. With these it

is capable of giving a most vicious bite, causing the blood to flow freely; and it requires considerable effort to induce the fellow to release his hold. This is the larva of the Eyed Elater (*Alaus oculatus*), and it is endowed with a most remarkable tenacity of life. When placed in 95 per cent alcohol for fully three minutes, it still continued to squirm about, whereupon it was consigned to pure formalin for ten more minutes, and this seemed to have the effect of aggravating its outrageously vicious temper. After its formalin bath it was thrown, with other specimens, into a box, and next morning it had apparently recovered. It was then posted to an expert for identification; went through the mail in a sealed vial, and was returned alive a week later. It still lives and is as fat and combative as ever.

Shortly after capturing all these specimens, the big larva shown in the upper left hand corner of Figure 3 was found and placed in the collecting case; it is of a pale creamy-white color. Hundreds of the Horned Passalus or Horn-bugs were found under the bark of the great rotten logs on the ground everywhere through this most interesting locality, and possibly the big larva in Figure 3 is of that species. A fine picture of these Horn-bugs is to be found in AMERICAN FORESTRY in an earlier number (February, 1917, p. 87, fig. 5), and they are more or less familiar to all of those of our foresters who keep their eyes open when in the pine-timbered districts of this country.

Returning to the other black beetle, referred to above as being found under logs and stones, it is easily recognized by the beautiful violet or deep purple hue it exhibits when held in certain lights. It has a length of about an inch, and a form somewhat resembling the species in Figure 3, while its habits are entirely different. Some text books call it the Murky Ground-beetle (*Harpalus caliginosus*), and it is known to feed on the larvæ of other insects, among them the "cut-worms;" it is extremely active in all of its movements. There is no trouble finding specimens of it, for the species is very abundant throughout the northern sections of the United States and southern Canada.



ONE OF THE DEAD OAKS

Fig. 2. The bark was suddenly ripped off, exposing various beetles and larvæ, and showing the borings and mines made by others. This oak tree possesses a diameter at the base of nearly two feet and a half, and has a height of about forty feet; it is entirely dead.

We have a very different beetle in the dull black one of which so many were found under the dead bark of the oak trees in this little swamp. The black beetles are *Alobates* (*Nyctobates*) *pennsylvanica* DeGeer, of the family *Tenebrionidæ*. There is no common name for this species, which is extremely abundant throughout the United States. It lives and breeds under the loose bark of decayed or decaying trees, but never attacks any living trees, nor does it cause the death of trees.

Various spiders are seen in such a locality as is here described, some of which are abundant species while others are more or less rare. One of the former is apparently a hunting spider that never builds a web (*Lycosa*), and it runs about on the ground through the grass and leaves with great rapidity. A specimen taken was carrying a silken ball full of small, yellow eggs. This it clung to with the greatest tenacity, and it did not lose its hold upon it until both spider and ball fell off a table in the photographic room. The spider was quickly captured and returned to the table, and it chanced to be released near an egg of the common Musk turtle. This it evidently mistook for its lost ball of eggs, and, strange to relate, it made an effort to deal with it accordingly, turning it around and about to secure the usual hold. But soon it realized its mistake and made another attempt to escape, being promptly captured and subsequently restored to liberty.

In this region there are not a few different species of salamanders, but not many kinds of lizards. One of the most abundant of the former is the Slimy Salamander (*Plethodon glutinosus*), of which an unusually fine example was taken upon rolling over a big, rotten log (Fig. 7). This is a perfectly harmless creature of some five inches in length—half of which consists of tail. This latter is subcylindrical in form and tapers to

a fine point. Upon picking the fellow up and holding it in your hand, the discovery is very soon made that it is extremely slippery and sticky—a condition due to its exuding from its skin a subtransparent mucus that is wonderfully adhesive and disagreeable. It is due to this that the animal has received its common as well as its scientific name; and should the reader ever lay hands on one of these pretty little batrachians in the woods, it will never be questioned that it deserves these suggestive names. They are mostly found, in this section of the country, where the land is somewhat rolling and wooded by big trees, as pines, poplars, chestnuts, and oaks. Generally they live under some good-sized, decayed log that has been rain-soaked by many a storm. Such a log should be turned over quickly—if possible, unaided by the right hand—as that will be instantly needed should one of these most agile little fellows be present in his chosen abode. When thus exposed, it looks very pretty indeed, even to a person who is not a naturalist, for its shiny body is as black as coal, being more or less speckled all over with the very finest of silvery specks, and these are well shown in the accompanying cut. On its under side the Slimy Salamander is of a dull lead-color, and here, too, it is speckled with fine little white specks, though less abundantly so. Its tail is *round*, and this character distinguishes it from other salamanders sometimes found in these southern woods. Its neck is moderately constricted, while its eyes, though not very large, are very prominent, as if bulging from its head from fright. By habit it is not an aquatic form—and indeed, when placed in a few inches of water, it immediately makes rather desperate efforts to get out of it. Most aquatic forms of salamanders have tails that are transversely flattened; they will eat small angling worms and the like, coming out of their retreats at night to find them—sometimes even during showers or cloudy weather. In a proper kind of vivarium these salamanders may be bred in captivity, as is the case with others of the species, and it is a very interesting task to rear them. Some of them are very handsome creatures, especially the Red and the Cave salamanders; as a matter of fact, the Tiger, the Spotted, and the Marbled salamanders are each and all very beautifully marked.



FOUND UNDER THE BARK

Fig. 3. Five living specimens of insects found under the bark of one of the dead oaks shown in Fig. 1. The large whitish larva was found under a log; was taken home, and now awaits transformation. All natural size, from life.

Speaking of the agility of the Slimy salamander, it is safe to say that it is quite snail-like when compared with at least one of the lizards, namely, the Red-headed lizard, famous in the southern part of its range under the name of "Scorpion" (*Plestiodon fasciatus*, Fig. 8). This species has, as in the case of others noted above, a wide range all over the eastern part of the United States. In fact, this most interesting lizard occurs from northern Connecticut, where it is rare, southward through Florida and westward beyond the Valley of the Mississippi and western Texas. It is a typical representative of the so-called "Skinks" or Smooth-scaled lizards constituting the family *Scincidæ*, the species of which are of no great size and are noted for their wonderfully glossy and smooth scales. There appears to be two genera of them represented in North America, containing over a dozen species. They are far more plentiful in the Old World, while Australia is abundantly supplied with them.

"Like the *Anguidæ*," says Ditmars, "the Skinks present interesting phases of evolution. Most of the species have short limbs, but are agile runners; others are serpent-like in body, and have extremely minute limbs with which they drag the body when progressing leisurely, but in time of danger fold them against the sides and glide away like a snake. Some have a minute pair of forelimbs only, and a few have but a pair of useless hind limbs. A number are limbless and snake-like."

All of our species of *Plestiodon* have their fore and hind limbs well developed and functional to a wonderful degree, for their agility is something truly marvelous. The species here under consideration is known by quite an array of common names, which is due to the fact that the species exhibits two very different patterns of coloration in passing from the immature to the adult stage of life. In fact, in so far as coloration goes, one would never suspect a young "Five-lined Skink" and an adult one of being the same species. When fully grown it may attain a length of over nine inches—very rarely more; and



THE COWSLIP

Fig. 4. A beautiful specimen of the American Cowslip or Shooting-Star (*Dodecatheon meadia*). Flowering in April. This is much reduced in size.

when held in the hand it has the feel and appearance of a very pretty china lizard, so smooth and glossy is it. The adult specimens are known as the "scorpions" in the South, or "red-headed lizards," and are greatly feared by the negroes. Generally they are of a deep shade of brown, darkest on the line of the dorsum, where no stripes are to be seen; though a faint striping on the sides may be noticed on the males; and it is in this sex that the brilliant, red coloration of the jaws and fore part of the head and face is seen. The striping, so characteristic of the young, is retained, to a certain degree, throughout life by the females. Old males exhibit a peculiar enlargement of the mandibular angles and hinder part of the head, which is very extraordinary.

One very beautiful specimen of the young was captured and, as in the case of the adult, fine photographs from life were obtained of it. It requires several hours of patient labor to get these, the subject requiring the greatest care, if for no other reason than the alacrity with which their entire tail will part company with the rest of the body. Should this happen when the creature is first captured in the woods, it may result in its escape; for the captor, thus having his attention suddenly drawn to the wriggling tail on the ground—and it is remarkable how long and energetically it does wriggle—is more than likely to relax his hold upon the lizard, which later, giving a sudden start, lands on the ground to make a dash for the nearest tree or mass of bramble. As has long been known, the tail grows out again, and is quite as perfect as the original one. Generally, the restored one is of a very pale color and devoid of all markings, though its scalation is complete.

Young individuals of this species are far handsomer than the adult ones, and when about a couple of inches



UMBEL OF FLOWERS OF THE SAME COWSLIP SHOWN IN FIG. 4

Fig. 5. There are no fewer than sixteen of them on their slender, nodding pedicles, the corolla of each being a pale purple. Natural size.

long they are beautiful creatures, with their extremely glossy, jet-black bodies, longitudinally marked with a median, dorsal line of intense yellow, and with two similar lines on either side of the same vivid color. These five lines are responsible for one of their vernacular names, as is their gorgeous, cobalt-blue tails for still another. The blue of the latter blends with the black of the body at the point of mergence. This coloration is



DUTCHMAN'S BREECHES

Fig. 6. Some unusually fine plants of the famous "Dutchman's Breeches" (*Dicentra cucullaria*), showing the perfect flowers, the dying ones, and the seed pods at various stages of development. Its root, formed of grain-like little tubers, are plainly seen in the case of the middle plant.

often retained until the lizard comes to be as much as five inches in length, at which time it gradually assumes the coloration of the adult, as described above. These specimens did not measure over six inches in length—that is, the full-grown ones—and we do not begin to meet with the much longer ones until we pass into the timbered districts of the Carolinas, where individuals nine inches in length are not uncommon.

It requires great agility on the part of the collector to capture these lizards in nature—a lightning-flash is as nothing compared with the astounding rapidity of their movements. On the trip here described only five were seen—four adult females and one young, blue-tailed one; and all were taken without the loss of a single tail or any injury whatever to the specimens. Later on, in the studio, eight negatives were made of them from life, such as are shown in Figure 8. There is no other such achievement on record for this species. All the specimens figured by Ditmars in his "Reptile Book" are from dead specimens, and he says: "This lizard is so difficult to capture that species of other genera, rarer and more restricted in *habitat,* are the most frequently seen in captivity. While collecting in the South in mid-summer, with Red-headed lizards or 'Scorpions' abundant on all sides, the writer succeeded in procuring less than a dozen living examples during two weeks' time, although every device, from a fine snare of copper wire to a baited hook, was tried. They would allow me to approach to within a distance of about ten feet, then scurry for cover. The reptiles invariably bask or hunt for insect prey within a short distance of secure hiding places, such as a burrow under a fallen tree, or a cavity in the trunk itself. Unlike many species of lizards that run for an indefinite distance when disturbed, then stop and peer back at the object of their fright, the Skink flashes out of sight at the slightest shadow. As it emerges from its burrow, it looks cautiously about to ascertain whether all danger is past, and the movement of a finger will send it back again."

The specimens described above were found hiding beneath the more or less loosened bark of logs of dead oak and pine trees lying on the ground, or, in similar situations on dead trees still standing. To make a capture, the bark was promptly torn off with the left hand, while the right was held in readiness to pounce upon any lizard that might be caught hiding beneath it. In tearing the bark away, we are also likely to find snakes, slugs,



SLIMY SALAMANDER

Fig. 7. A wonderfully fine specimen of the Slimy Salamander. Note how prominent the eyes are, and that its tail has about the same length as the rest of its body.

beetles, ants, centipedes, larvæ, scorpions, and the rest.

On his second trip, made during the chilly days of early spring, Doctor Ditmars was far more fortunate; for then he could find these lizards under the bark of dead trees, too; "there was no difficulty in collecting large numbers . . . and within ten days over two hundred of the desired examples were taken, showing all phases of the color variation from the young individual to very old specimens."



CAN LEAVE ITS TAIL BEHIND IT

Fig.8 . An adult Race Runner or Six-lined Lizard (*Plestiodon fasciatus*). Natural size. One of the most difficult lizards of the order to photograph; it has never been taken as here shown before.

The female of this species lays from three to four eggs, usually depositing them on the ground beneath a strip of detached, dead bark of a tree. During incubation she coils about them like a python does among snakes, until they hatch out. After this, she pays no attention whatever to the pretty little young ones, which at once scamper off to to look out for themselves—and they find no trouble in doing so. The period of incubation is very brief, much briefer, indeed, than with other species of our lizards; while in the horned groups (*Phrynosoma*) the young are born alive. Now, what has been described for this restricted area is quite applicable to a very large part of the rest of the territory. One must not lose sight of the fact, however, that the subject has been but little more than touched upon—a wonderfully light touch at that; for, as shown in the leading paragraph, several goodly volumes might be published on the biology and botany of half a square mile, or less, the subject being little more than opened up. Counting frogs, snakes, lizards, hylas, toads, turtles, tortoises, salamanders, newts, and the rest, among reptiles and batrachians alone of the vertebrates, there are scores of different species of them, and we know comparatively very little about their intimate habits, anatomy, physiology, or reproduction, and this leaves out all the mammals, birds, and fishes, not to mention the trees and plants, with thousands of species of invertebrates, as crabs, mollusks, crays, aracnids, insects, worms, moths, butterflies, and a host of other forms.

IN MEMORIAM

LINES SUGGESTED BY THE REQUESTS FOR PERMISSION TO PLANT MEMORIAL TREES IN THE LINCOLN MEMORIAL GROUNDS, WHICH WAS GRANTED TO RELATIVES OF THOSE WHO DIED IN ACTION OR FROM WOUNDS RECEIVED IN ACTION IN THE LATE "WORLD WAR."

Move softly thru these stately trees,
And ponder,
While they speak of deeds o'er seas—
O'er yonder.
Listen to their moaning sigh,
Watch the sad and drooping eye,
In mem'ry of the wounds that cry—
O'er yonder.

In mem'ry only for the meek—
So ponder.
Of brave and noble do they speak—
O'er yonder.
So gently tread beneath their shade,
Away from sound of pick and spade,
And mounds of earth just freshly made—
O'er yonder.

They gently wave their leafy arm—
So ponder.
Toward the distant strife and harm—
O'er yonder.
They tell a tale of nations born;
They softly speak of hearts so torn—
But wave aloft a hope of morn—
O'er yonder.

—S. A. White.

SPRING ON THE MARSHES

BY A. A. ALLEN

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

SNUGGLED between opposing hills at the head of Cayuga Lake is a tract of land locally known as the Renwick Swamp. To some it is the only blot upon an otherwise beautiful landscape, and the one hindrance to a prosperous city. To others it is one of the greatest assets which this bit of country, richly endowed by nature, affords. For ages the picturesque streams, which tumble down from the hills have been depositing their burdens of silt into the deep waters of the lake until a great delta has been formed, a delta upon which rests much of the city of Ithaca and upon whose outer stretches lies the verdant marsh. Each year sees more and more of this marsh "reclaimed" by filling, but each year the north winds form new bars in the shallow waters at the head of the lake and more of the lake is claimed by the marsh. Ten years ago the cat-tails waved where now an extensive aviation field invites the man-made birds, but ten years ago the storm-tossed waves lashed a great area where now the cat-tails beckon to the passing marsh birds. Thus, as the years roll by, will the luxuriant marsh always lead the way in the conquest of new land and the transformation of the lake bottom into industrial sites. But for the present this area, together with thousands of similar ones, will be classified in our economic atlas as *waste land*. Waste land indeed! Let Nature speak and she would decry the insinuation. Here is a place so loved by her that not one cubic inch is wasted. Year after year the green flags wave, crowded closer than the skilled agriculturist can force his crops. Down beneath the flags, the water plantains, the smart weed, and the arrow arums, the duck weeds, the milfoils, the bladderworts, and the algae fill every available inch with luxuriant growth. Nor does the abundance of the vegetation exceed the animal life that dwells there. Birds, beasts, and fish and myriads of winged creatures are here found in greater numbers than any where else. Some there are who shun the marshes as the abode of snakes and fever, haunt of naught but evil, and to them the strange voices which come from its unknown depths are uncanny. The rhythmic waving of the sedges, the cold breezes at evening, and the blackness of its waters portend no good. But some there are who have spent hours wading through its dark waters; who know when the pickrel run and the bullheads nest; who know when the mallard and the widgeon and the pintail circle over its ponds and who know in which high elm the wood duck nests. They know how the redwing hangs its nest and where to find the coot and the rail.

THE LOON

By Lew Sarett

A lonely lake, a lonely shore,
A lone pine leaning on the moon;
All night the water-beating wings
Of a solitary loon.

With mournful wail from dusk to dawn
He gibbered at the taunting stars,—
A hermit-soul gone raving mad,
And beating at his bars.



Photograph by A. A. Allen.

SPRING ON THE MARSHES

The marsh at the head of Cayuga Lake as it was ten years ago. Today much of the marsh here shown is occupied by an aviation field while the marsh itself has advanced to claim much of the lake shown in the photograph.

They have looked into its dark waters and seen the caddice worm carrying its case and have watched the dragonfly nymph stalk its prey. Lucky few who know the marshland and therefore love it; who know it and rejoice in their knowledge.

Early in March when the ice has scarcely thawed from its flooded surface, before the pike have begun to splash and before any birds have come, the notes of a sun-warmed peeper announce that spring is on its way. And next, from out of the clear blue sky comes the low sweet chuckle of the first bluebird. The joyful "gurgle-lee" of the redwing greets one's ears, and towards dusk the wild ducks fly in narrowing circles and alight with a splash among the brown flags. The geese go honking overhead in a great wedge, and then comes the spring. Three times the peepers have been frozen and thawed again; three times the ice has formed over the spawning pike; three times the marsh has been white in the morning and brown at noon and now, by the laws of the marsh-dwellers, spring has come. Each evening great flocks of migrating redwings arrive like smoke and each morning they depart for northern marshes, males first by themselves and two weeks later the females. All night the shrill notes of the peepers fill the air with a deafening chorus. The yelping of the wood frogs and the lower pulsating choir of the meadow frogs announce that soon the waters will be teeming with tadpoles. The first dragonfly darts after some luckless gnat that has seen fit to transform so early and a small flock of tree swallows comes swimming from the south. Let us wait until the middle of April, however, before we don our high boots and start out through the marsh, for from that time until the first of June the marsh is at its best.



Photograph by A. A. Allen.

HOW THE REDWING HANGS ITS NEST

This is one of the earlier nests of the season, built in late April and fastened to the stubs of the cat-tails.

The earliest cat-tails and water duck have now reached the surface of the water and give the first greenness to the marsh. Large ponds mark where the sedges will later appear for they are slower in starting and the winter fires have not left even a brown stalk showing above the water. The marsh resounds with the music of the redwings and many strange calls emanate from tangled places that one is eager to explore. A great liquid call comes from a matted patch of sedges at the edge of the marsh. "Obble-obb, ooble-oob," like water being poured from a huge jug, these notes being preceded by a tapping sound as though some one were striking a stake with a mallet. It is the bittern or "stake driver," and if we are fortunate we may be able to stalk him and catch him at his work, though more likely we will almost step on him, so inconspicuous is he in his brown plumage. As the tapping starts again one may see his gulping contortions as first he claps his bill and then makes the motions of swallowing with great difficulty, but he never puts his bill beneath the water as is sometimes stated. As one approaches



Photograph by A. A. Allen.

JOY ON THE MARSHES

This little swamp sparrow is expressing his appreciation of the luxuriance of the marshes.

closer the strange bird instead of flying immediately, may stretch up his long neck and point his long bill toward the zenith simulating a broken snag projecting from the water. If he is among the brown sedges he will be practically invisible because his neck is striped with brown and buff and resembles the lights and shadows of the dead vegetation. If one tries to circle about him, he slowly rotates so as to present always his striped neck, but finally frightened, he springs clumsily



THE HOME OF THE MARSH WREN

But this is merely a dummy nest built by the male while waiting for the female to arrive.

into the air and sails off across the marsh, gradually drawing his head back onto his shoulders and trailing his long legs behind after the manner characteristic of all the herons.

As he disappears from sight a splashing in the water may attract ones attention to a spot where the pike are spawning. The dorsal fins of the huge fish can be seen above the surface as side by side they swim back and forth through the vegetation scattering the eggs. They came up from the lake when the ice melted and they will return when their labors are completed. Big fellows they are, some of them weighing ten or fifteen pounds, and if one remains quiet they may swim so close as to show their broad flat snouts, the snaky yellow markings in their dorsal fins, and the small white spots along their sides. Many times in one's journey through the marsh he will be startled by a big splash almost under his feet as he frightens one of these large fish from its hiding place and he will be able to follow its wake as it darts off zigzagging through the flags.

Numerous spherical bunches of meadow frogs' eggs held up from the bottom on the slender reeds or brush and tangled strings of yarn-like toads' eggs are everywhere conspicuous, and the jubilant thrills of the toads announce that their breeding season is not yet over though most of the frogs have left the marsh. There are many other sounds, almost as incessant, that one may long be at a loss to explain. From a tangled mass of brown cat-tails comes a peculiar grinding sound as though some one were gritting his teeth. This is followed by a clicking noise much like an old-fashioned sewing machine, and then out from the top of the tangled flags bursts a little brown ball. Floating upward like a tuft of cotton, it breaks into most vivacious music and then drops back into hiding to continue its scolding. It is the long-billed marsh wren and as one remains quiet,



Photograph by A. A. Allen.

THE GUARD

One cannot enter the marshes without being scolded by the marsh wrens. This is a short-billed marsh wren.

its inquisitiveness soon gets the better of its timidity and it runs up a reed to get a better view of the intruder, carrying its tail cocked forward over its back in most impish fashion. Again it floats upward, all its feathers fluffed out and its short wings vibrating so rapidly that they are scarcely noticed. The cause for all this excitement we are not long in discovering, for hung conspicuously among the dead flags, is a ball of brown sedge leaves with an opening in one side. Always busy, always

mischievous, the little wren has already completed one nest and will doubtless build several more before his mate arrives, but when she does come, she will spurn them all and start a new one of her own.

As one watches the wren he may be surprised by a loud call on the far side of the tangle: "Ticket, ticket,



Photograph by A. A. Allen.

HE CALLS FOR YOUR TICKET

Ticket—ticket—ticket, is one of the spring calls of the Virginia Rail that one hears often but seldom traces to its source.

ticket, ticket," as though an admission fee were to be charged before one could see further secrets of the marsh. It is one of the notes of the Virginia rail but it will take some careful stalking before one sees the



Photograph by A. A. Allen.

THE WATER CHICKEN COMES HOME

The Florida Gallinule or Water Chicken is responsible for many strange sounds that emanate from the marsh.

slender dark brown bird with a rather long reddish bill sneaking between the cat-tails, its short tail cocked up like a little brown hen. It is difficult to make it fly unless one corners it and even then it may dodge back between ones feet rather than trust itself on its rather feeble wings. A little later one may be startled by loud clucking sounds and then an almost ear splitting, "WUP-PUP-PUP-pup-pup-pup" announces the presence of a Florida gallinule or water chicken, a bird of the size of a small bantam, slaty black in color except for its red bill and green legs. The bill is set off by a large red plate on the forehead and a greenish tip while the green legs are trimmed with little red bands like garters.

Occasionally one may hear a call that begins like the gallinule's but ends with almost plaintive cooing. "WUP-PUP-PUP-pup-pup-pup-caow-caow-caow-caow," it floats across the marsh and it will probably be a long time before one associates the call with the obscure, timid bird we know as the pied-billed grebe or "hell-diver."



THE REDWINGED BLACKBIRD—DOMINANT BIRD OF THE MARSHES.

This is a female and she does not have the red shoulders.

It is a little early yet to look for its floating nest and even later when the bird is incubating it will be almost impossible to find it, so much does it resemble the small platforms of debris thrown up by the muskrats, for the mother bird always covers her eggs before leaving the nest so that passing enemies will not discover them.

The red-winged blackbirds are scolding all about one, and one expects to find many of their nests. It is still too early, however, for although it is a month and a half since the first redwings were seen, the females that are to nest in this marsh are just arriving and the males are welcoming them. Whenever a female in her streaked coat appears, she is pursued by several males, now close against the water, now high in the air as though they must display to her their strength of wing. Again, several males may be seen mounting upward for hundreds of feet, then

hovering there on suspended wing like so many skylarks, finally floating back to the marsh with feathers ruffled and epaulets flaming.

The marsh is a glorious place to be on one of these warm spring days, especially early in the morning or toward dusk when one is almost overwhelmed by the abundance of life. And even during the night the marsh



Photograph by A. A. Allen.

THE HAUNT OF THE HELL-DIVER

The pied-billed grebe here shown with its young is ordinarily a silent, seclusive bird, but during the spring the marshes sometimes resound with their loud cooing notes.

dwellers are far from quiet. The frogs and toads maintain a sonorous accompaniment to the varied calls of the birds. The spasmodic songs from excited swamp sparrows and the weird calls from startled rails and gallinules mingle with the almost incessant chatter of the marsh-wrens until long after midnight. Then all is quiet for a few hours, but long before the first signs of dawn appear the activity begins once more. By four o'clock the song sparrows are singing and a few minutes later the swamp sparrows begin their sweet twitter. The stars are still bright when a short-eared owl gives its peculiar call and soon is dimly seen as it circles near. The sparrows continue to sing and a half hour passes before the first bittern sounds its liquid notes across the marsh. Then the gulls begin to gabble on the lake and ten minutes later the Wilson's snipe begin to bleat and a strange winnowing sound pulsates across the marsh as they perform their aerial evolutions.

It is now three-quarters of an hour since the first sparrow sang, the morning star has sunk below the horizon and the first signs of dawn have appeared. The gulls start up the valley for their daily skirmishing in the fields and the first redwing is heard. As though awaiting the signal, a hundred birds give answer, and day is proclaimed. The stars die out and the color appears in the east; the greens and yellows change to rose, and the rose to red. A great blue heron leaves his roost in the woods and starts for his fishing grounds. A pair of teal swing across the field of vision, dark against the sky. A few restless grackles start up from the marsh, heading for the hill, and soon the morning flight of redwings begins. Scattering over the marsh, they do not leave in the compact flocks that are so characteristic of the evening flight. Single birds more uneasy than the rest, loose groups of seven or eight, and at times slightly larger flocks, fly toward the hills to the east and to the west. By eight o'clock most of the redwings have left, and two hours later one would scarcely know there had been a redwing in the marsh. If we have spent the night in the marsh, we are now content to leave, for we have experienced one of the most stirring phenomena that Mother Nature has to offer. When thousands of other experiences crowd into our lives and dim our memories, one picture will retain its freshness; it will be spring on the marshes and the awakening of the birds.



OLD LOVING CUP CARVED OF WOOD

This cup, which is in the possession of Mrs. Margaret Schultheis, Main avenue, Montebello Park, Harford Road, Baltimore, is a century and a half old, having been exhibited at the world's fair in Vienna in 1776 and at the Centennial in Philadelphia in 1876. It is the work of L. R. Wildenforce, and is exquisitely wrought from a brown wood. It has a silver cup inside, which is covered by the carved lid. The figures represent Bacchus and a group of nymphs and satyrs and the small figures are perfect in every detail.

"HALL OF FAME" FOR TREES

In the beautiful cemetery known as Magnolia Garden in a suburb of Charleston, South Carolina, is an oak that is a rival of old St. Michael itself; a rival on account of the attention it receives from the many visitors into this charming, old Southern city. This oak is of the variety which is always green, and it has a fantastic drapery of the gray Spanish moss. The splendid old tree is estimated by antiquarians to be at least seven centuries old. Though there is no historic story connected with it, it has been nominated in the Hall of Fame by Miss Viola Overmann on account of



THE CHARLESTON OLD OAK

its age, its size, its beauty, and its natural swing-curved branches. A tree in a cemetery must needs live a very quiet, melancholy, secluded life. But perhaps this old tree knows many things of interest as it has not always graced a cemetery. It was standing years and years before the cemetery was laid out around it. And the city of Charleston has had more than its share of turbulent history.

A New England writer, a lover of trees—made an especial study of the oak. He learned that while other trees shirk the work of resisting gravity, the oak defies it. It chooses the horizontal directions for its limbs so that their whole weight may tell—and then stretches out fifty or sixty feet, so that the strain may be mighty enough to be worth resisting. To slant upward would mark infirmity of purpose; to bend downward, weakness of organization.

Two branches of this Charleston oak do bend downward; one touching the ground, making an artistic seat; the other, curving down, then up and out again. The massive trunk leans somewhat—the result of a fierce tornado, or perhaps a tell-tale reminder of the disastrous earthquake which visited this city many years ago. But time and nature have healed the wound, and the branches still live and flourish.

"HALL OF FAME" FOR TREES

Two and a half miles south of the city of Daytona, Florida, stands a tree well-known throughout the United States, nominated by Miss Viola Overmann for the Hall of Fame. It is a giant oak, measuring thirty-five feet in circumference at the base. On account of the leaning propensity of the large oak it is often referred to by artists and botanists as Old Pisa. It stands in the middle of a beautiful orange grove and its branches extend over almost an acre of ground. Props have been arranged underneath the heavy branches to assist Pisa



OLD PISA

in its fight to live. A rustic ladder has been constructed, so tree lovers (and other lovers) may climb into its topmost and farthermost boughs.

Old Pisa's age is a mere conjecture. But it is believed by botanists that it was an old tree when the site, which is now the city of Daytona, was then the Indian village—Autumcas. At the close of the Seminole War in 1835, Autumcas was deserted. In 1870, Mathias Day, of Mansfield, Ohio, visited the spot, and founded the town of Tomoka. Later a landscape artist, whom Mr. Day had employed, changed the name from Tomoka to Daytona. Daytona is now one of the greatest motoring centers in the United States, besides being a fashionable winter resort. The hundreds of travelers, whether they are pedestrians or motorists, find their way to this great old tree. One cannot help but speculate just who or what will be the final straw that will break Old Pisa's back.

"HALL OF FAME" FOR TREES

The "Lee Oak" at Cincinnati has a place in the Hall of Fame. It is on the property of William A. Windisch. The tree seems to be a puzzle to the experts. It was discovered by Dr. Thomas Lee in 1836, and in the description he wrote of it a few years later, gives its location as "four (4) miles back of Cincinnati on the Cornish Farm." In honor of its discoverer it was called the "Lee Oak," and has gone by that name ever since. It turns out to be a remarkably rare variety of the oak. Specimens once reported near Alexandria, Kentucky, and at Waynesville and Loveland, near the Miami River, have disappeared. California was said to have some of the trees, and the eminent English naturalist, Sir William Hooper, when he came to this country in 1870, spent some time with Professor Asa Gray in searching for them there. The question now receiving attention is whether the "Lee Oak" is a straight species or a hybrid. To settle the matter, Captain William Holden, Librarian of the Lloyd Library, has given time and effort. His searches led to the identification of the tree as the original "Lee Oak." He has sent acorns from the tree to the Academy of Sciences, Philadelphia; National Museum at Washington and the Botanical Institute at Harvard. The developing young oaks that will grow from these show whether or not the "Lee Oak" is a true species or a mere hybrid, the rule being that where there is a true or straight species the descendants show all the same marks or characteristics, whereas with the hybrids there is a decided variation. The form of the leaves at various stages of their development is what is relied on to settle these points. The tree is about seventy-five feet high and its branches spread out seventy-five feet. It measures ten and a half feet in circumference about six feet from the ground.



THE LEE OAK



THE GREAT GRAPE VINE

"HALL OF FAME" FOR TREES

Every year two tons of grapes are taken from this vine said to have been planted by Sir Walter Raleigh's colonists. That is the reason for nominating this, the Largest Scuppernong Grape Vine in the world, for a place in the Hall of Fame. The vine is on Roanoke Island, North Carolina, and A. D. Dart, who makes the nomination for a place in "Who's Who" of things that grow, says the vine is 300 years old. It has to be propped up for it covers more than an acre of ground. A Mr. Meekins, who purchased the farm in 1797, told a grandson that the vine was then about the size it is now. Many of the branches of the vine have taken root and the main branch has a circumference of sixty-nine inches.

Every Oberlin College "grad" knows the old Elm on the corner of the campus at Main and College Streets. This tree is given a place in the Hall of Fame because beneath this tree in 1833 the first log house in Oberlin was built. This



THE OLD ELM AT OBERLIN

was the start of Oberlin College, Ohio, soon after to be known to fame as the first educational institution in the world to admit women on an equal footing with men. In those days co-education was only spoken of in whispers. Lucy Stone, the original suffragist, was graduated from this school. The Elm has been marked by a bronze tablet and the tree encircled in a fence.

The Bartrams' Botanical Gardens in Philadelphia were especially noted, both in America and England, for their extremely large cypress trees.

No botanical garden of any size is complete without a cypress. There are reasons for this choice—reasons, pretty and sentimental, and the Bartram Cypress has been nominated by Miss Viola Overman.

The cypress is considered a sacred tree. It is believed to have graced the celestial Garden of Paradise. The cypress is as well a mysterious tree. It is sad, gloomy, and always mourning.

None of the Bartram Cypresses are standing today. A massive bole of one is being preserved to show the immensity that the cypress, under favorable circumstances, can achieve. Philadelphia has not forgotten John Bartram and his son. To perpetuate their memory and to keep fresh in mind their botanical achievements, accomplished under so much difficulty, there was organized twenty years ago a Bartram Memorial



Courtesy of Pond.

THE BARTRAM CYPRESS

Library Committee. This committee, in that time, has collected many hundred volumes, illustrating the progress of American botany. At stated periods, opportunity is given for visitors to examine the precious books and to listen to learned botanists discuss them.

THE WILD FLOWER GARDEN

BY BESSIE L. PUTNAM

NATURE is most lavish with her blossoms in early springtime, and those who wish to transfer a bit of woodland beauty to the lawn or garden as a permanent decoration will, if care is made in the selection, rarely find her treasures disappointing. We can scarcely expect to grow the woodland ferns on a southern exposure, or lovers of the bog in ordinary garden soil; yet there are some exceptions even as surprising as these. However, the most successful collection is made from plants which seem naturally to thrive best under conditions nearly identical with those which we have to offer.

There is great pleasure in growing them, thus being enabled to watch the daily transformations in growth more completely than is usually practicable in their native haunts. Most of them may be transplanted during the season of active growth, though doubtless if they could be located during the dormant season the results might in some cases be better. Note the character of the soil and the general surroundings, duplicating them as far as possible, and in most instances the results will be gratifying.

The Bloodroot, *Sanguinarian Canadensis,* common in rich woodlands where it has not been exterminated by professional root diggers for its reputed medicinal value, is in bloom with the crocus and readily adapts itself to garden culture. It is an interesting as well as beautiful plant throughout; the bright red juice abounding in the thick rhizomes and giving to the plant its suggestive name is changed to an orange color in the leaves and stems, even the stamens and pistils being charged with it, and we marvel at the miracle of the spotless petals evolved from the colored fluid. Like its near relative, the poppy, the flowers are ephemeral, but their rare beauty compensates for this disappointment. Once planted, it will thrive indefinitely, and is one of our most beautiful native perennials.



Photograph by Dr. R. W. Shufeldt.

BLOODROOT

One of the most beautiful of our native perennials, and pure whiteness of the petals are in rare contrast to the blood-red stems.

Only a few days later come the hepaticas, varying in color from the most intense blue or pink through all the intermediate shades to pure white. The leaves are evergreen, renewed in early spring, and this is a valuable plant for a rockery, thriving best and showing its most intense colors when grown in partial shade, though it grows fairly well even in sunshine if supplied with moisture.

The spring beauty, *Claytonia,* is notable as the first plant that Dr. Gray ever tried to analyze; and while he made a little mistake in the species, the only real difference between *C. Virginica* and *C. Caroliniana,* the only species of the East, is in the shape of the leaf, his error, corrected later, is not surprising. It is easily recognized by the carmine-penciled blossoms, the intensity of coloring being largely regulated by the amount of shade furnished, though the plants thrive equally in sunshine or shadow. The dark brown, slightly flattened bulbs grow as much beneath the surface as the plant extends above it, a hint to the one who transplants; if care is taken in digging it up not to injure the stem it is as easy to grow as an onion. The bulbs are admirably adapted to lawn after the manner of the crocus, since like the latter they die to the ground before the coming of the lawn mower, but not until they have matured seed for an increase of beauty.

The same treatment may be given to the Yellow Adder's tongue, *Erythronium Americanum,* which John Burroughs has poetically styled "fawn lily." There is a two-fold appropriateness in the name, for the erect leaves have well been likened to the ears of a startled deer, while the mottled colors, with a distinct fawn color more or less in evidence on the outside of the miniature yellow lilies, easily suggest the name. The leaves are strangely beautiful, with their satiny sheen, each irregu-

larly marked with brown or purple; but the warm sunshine is trying to this product of nature's art, and soon after the flowers have faded the leaves turn a pale green, in a short time disappearing.

As the bulbs grow deeper every year until they have



PINK COLUMBINE

The charming blending of colors and the light and graceful form of the blossoms lend great decorative value to the plant.

reached maturity, did you ever wonder just how this growth is accomplished? Mark a spot frequented by them, and unearth the subterranean work in August, or early September. Each young bulb will be found busy planting itself—or rather its successor—more deeply. The bulb first sends out a glistening white root, which delves down deeper into the soil, and at the end of which eventually forms a new and larger bulb.

The plant readily adapts itself to cultivation; and while only the plants showing two leaves—one always a little larger than the other—blossom, we have failed to detect it if the little garden colony blossoms less freely than its woodland neighbors.

Jack-in-the-Pulpit, *Arisaema triphyllum,* by nature a bog-lover, is by no means as fastidious as the most of its clan, and a moist, slightly shaded spot in one corner of the yard will amply supply its demands. This plant is a near relative of the cultivated calla, with purple and white or green and white striped blossoms—usually



Photograph by Dr. R. W. Shufeldt.

HEPATICA

Hard to photograph, as it thrives best in shade, where it developes beautiful flowers of intense blue or pink.

called flowers. The real flowers, though, are deep in the center of this showy dress, at the base of the central spadix, and may be either fertile or sterile. Strive to obtain a specimen of the former, usually more robust in

growth, and bearing a cluster of flaming red berries weeks after the staminate flowered specimens have entirely disappeared from sight.

The solitary columbine found east of the Mississippi, *Aquilegia Canadensis*, is a charming combination of light yellow and coral red, an unusual blending of colors. The form of the blossoms is light and graceful, and the entire plant has a highly decorative value. It is easily transplanted, even when in full bloom, seeds freely, and the



Photograph by Dr. R. W. Shufeldt.

JACK IN THE PULPIT

Flaunting its brilliantly marked flowers, this cousin to the cultivated calla is well known and loved by all who roam the woods.

seeds are always well matured—which is not always the case with seeds of native plants. If allowed to fall where they ripen, other plants of blooming size will be ready the next season. As a plant for a rockery or perennial hedge, it is fine, and is certain to succeed with the most amateur flower grower.

These are only a few of the number which easily adapt themselves to cultivation, and any flower lover who really wants a fine collection of native plants can have them. Many ferns will thrive if shaded and well watered through the summer months. This is especially true of the stately *Osmundas*. There are vines galore, as the Virginian Creeper, Virgin's Bower and Bitter-Sweet. Spring blossoms usually go as quickly as they come, but there is a perpetual succession of bloom if nature's calendar is followed. Shy and rare plants should be left undisturbed in their native haunts. There is material for a whole book on the protection of our native plants. But



Photograph by Dr. R. W. Shufeldt.

SPRING BEAUTY

Well named, with its beautiful carmine-penciled blossoms—a veritable delight to lovers of earliest spring flowers.

many species are more than holding their own in the woods and fields; and among these we may be able to select enough to form a choice bit of wild nature near at hand.

TREES

BY THEODOSIA GARRISON

Gray sky above a sombre earth. The hue
Of sorrow everywhere, yet I find ease
And new-born courage in the sight of you,
My trees.

I who have watched you merry in the blue
Spring dawns, and loud with Summer's hundred glees,
See you, still valiant, dare the tempest through—
My trees.

Give me your ancient message bold and true—
I come a child to very Wisdom's knees—
Your strength, your fortitude. Oh, teach anew,
My trees.

CIVILIZATION'S HIGHWAYS

SHALL WE HAVE THEM AS STREAKS OF CONCRETE ACROSS THE COUNTRY BLISTERING IN THE SUN OR SHALL WE MAKE THEM "ROADS OF REMEMBRANCE?"

TWENTY years ago automobiles were barred from Central Park in New York City. Today the automobile is our second great means of transportation for men and merchandise. Figures compiled by Alfred Reeves, of the National Automobile Chamber of Commerce, show the motor industry to be nearing the two billion dollar class. In addition to this a tremendous sum has been voted for improving our roads. Here are the figures: Alabama, $1,000,000; Arizona, $6,250,000; Arkansas, $4,397,398; California, $20,000,000; Colorado, $8,000,000; Delaware, $8,528,000; Florida, $8,000,000; Georgia, $7,911,000; Idaho, $2,100,000; Illinois, $6,013,304; Indiana, $12,000,000; Iowa, $20,498,534; Kansas, $8,000,000; Kentucky, $3,500,00; Louisiana, $2,000,000; Maine, $1,630,000; Maryland, $6,750,000; Massachusetts, $6,000,000; Michigan, $15,000,000; Minnesota, $11,127,986; Mississippi, $7,000,000; Missouri, $5,413,079; Montana, $6,300,000; Nebraska, $2,000,000; Nevada, $1,377,499; New Hampshire, $1,630,000; New Jersey, $6,500,000; New Mexico, $4,000,000; New York, $2,000,000; North Carolina, $5,000,000; North Dakota, $1,082,000; Ohio, $13,321,500; Oklahoma, $3,600,000; Oregon, $8,000,000; Pennsylvania, $8,780,000; Rhode Island, $1,470,000; South Carolina, $7,000,000; South Dakota, $6,767,276; Tennessee, $3,650,906; Texas, $60,480,000; Utah, $10,092,794; Vermont, $1,797,650; Virginia, $3,400,000; Washington, $6,500,000; West Virginia, $2,000,000; Wisconsin, $3,200,000; Wyoming, $6,500,000; Total for the United States, $340,394,536.

From voting $340,000,000 for good roads it is a long look back to the time of Jean Frederic Oberlin, of Alsace, whose fame is based upon the fact that he built a road. This man for whom Oberlin College in Ohio is named, took, in 1767, an isolated pastorate and at once saw that its very isolation was the cause of its poverty and ignorance. His answer to the problem was good roads, which were non-existent in the Ban de la Roche. The mountain passes were constantly broken up by torrents, and avalanches of loosened earth, and there were no bridges save stepping stones. Oberlin decided to open communication with Strasbourg, a short distance away; but the peasants were at first so suspicious that they conspired to waylay and beat him. However, he called the chief inhabitants of the region, and proposed that they should blast the rocks and make a wall a mile and a half long to protect a projected roadway to the river Bruche, over which he also proposed to build a bridge. When they refused, he, with one servant, took pickaxes and started on the task. His sincerity produced a reaction and presently he had a small army of workers to assist him. With financial aid from friends in Strasbourg he completed the road, the protecting wall, and the bridge in three years. Communication established, an industrial revolution began in the Ban de la Roche. The boys learned the crafts of carpenters, masons, glaziers, blacksmiths, and wheelwrights, trades previously unknown to the region. Wretched cottages became habitable. Is there a section in the United States to which the Oberlin formula can be applied? It seems that our citizens think so.

WHAT IS YOUR TOWN DOING?

Which state will make the best record in Memorial tree planting? The American Forestry Association announces that Minnesota and New York are in the lead among the Northern States, and that Georgia and Florida are in the lead of the States farther south.. The American Forestry Association is registering all memorial trees on a national honor roll, and will send anyone free instructions on tree planting and a tree-day program.

In Minnesota a campaign has been started for memorial tree planting by the school children by the Minnesota State Forest Service. Arthur F. Oppel, of the State Forestry Department has issued instructions to the forest rangers and offered aid in tree distribution. Rangers will be allowed a certain number of trees. This is the first attempt of this kind, so Mr. Oppel reports to the American Forestry Association, and the service is limited as to trees, but has bigger plans under way for next year.

The New York State College of Forestry sends out a call for memorial tree planting and directs all tree planters to register their trees with the American Forestry Association. Every individual or organization planting a tree is urged to register it with the American Forestry Association and get the free certificate of registration which the Association will send.

Now there is a fine opportunity for making our roads memorial highways by the proper planting of roadside trees. In many states such plans have long been under way. Reports to the American Forestry Association show the plan is being taken up in hundreds of municipalities. Perhaps the most interesting activity is in the little state of Delaware. General Coleman duPont has provided four million dollars for the building of a highway. The fund has been accepted by the State Highway Department of which J. G. Towsend, Jr., is the chairman. In General duPont's scheme of things is



A CROSS OF TREES

The most unique "Road of Remembrance" plan reported to the American Forestry Association comes from the Women's Auxiliary of the Chamber of Commerce of Macon, Georgia. Bibb County will have two roads so planted as to form the cross. These roads will be planted with memorial trees in honor of the men and women of Bibb County who served in the world war. The inserts show two trees nominated for the "Hall of Fame." Trees with a history are being nominated for this honor from all parts of the world.

incorporated a plan for the proper planting of memorial trees. He called in Samuel C. Lancaster, the builder of the Columbia River Highway, who has made a survey of the State. In the report, after he had studied the Delaware trees, he speaks of "Glorified Highways" in pointing to Delaware's opportunity. On this point Mr. Lancaster says:

"A citizen of Delaware motored through the gorge of the Columbia recently, and when he saw how careful we



Courtesy of the Chicago Tribune.

A ROAD IN ILLINOIS

Showing the condition before road builders made it what it is today.

had been to keep the trees, both small and great, together with the flowering shrubs, so as to preserve the natural beauty all about us, he commissioned me to outline a plan for beautifying your highways.

"In order to be able to advise you intelligently, I have gone over the State twice for the purpose of studying your varying soil conditions, being careful to note what trees and shrubs do best and live the longest in each situation, for from these typical specimens it will be wise for you to make your choice.

"Having seen your finished roads and comprehending your plans for the future, I wish to congratulate you upon your breadth of vision, for when the permanent pavements are completed throughout the State of Delaware and suitable trees have been planted by the roadside, you will head the list for permanent highways among the States of the Union on account of the excellence of your thoroughfares, and they will be the peer of any in the world.

"The roads of Continental Europe have been planted in many different ways with many kinds of trees in order to accomplish certain results. Suffice it to say that we are familiar with their system and have endeavored to profit by the lessons they have taught. Nevertheless, we must not forget that we are living in a new age; the new types of conveyance—the high-powered automobile and auto truck—have changed old methods of highway transportation and it is affecting our living conditions by eliminating distance, bringing communities closer together and providing the former with better markets and the comforts of city life without the crowding.

"If you make the most of your opportunity, you should beautify your roads and certain small tracts in and about your towns and cities and do it in the very best way. We believe the right way to obtain the best results is to stay as close to nature as possible and avoid all formal planting. . .

"In conclusion, permit me to say that I appreciate greatly the honor of having been asked to come to Dela-



Courtesy of the Chicago Tribune.

THE FIRST IMPROVEMENT

Showing the road in the next column after it had been improved. The second step will now be the planting of trees along the roadside in order to beautify it.

ware and prepare this report. The same careful thought has been given to the consideration of your problems as was given to the people of Oregon when they employed me as consulting engineer to fix the location and direct the construction of that now famous highway through the Gorge of Columbia, of which the late Frederic Villers, veteran British war correspondent of the *Illustrated London News*, said, 'It possesses the best of all the great highways in the world—glorified.'

"Your people are going to glorify the highways of Delaware. In outlining a plan, I have spoken to you out of the experience of a lifetime and have given you the best there is in me. The work which you are doing will live and if you plant the trees by the roadside, future generations will call you blessed."

Of course, there is not a Coleman duPont in every State, and Delaware is to be congratulated upon having the service of such a man. But what of other States?

There is Georgia, with the "Roads of Remembrance" work and memorial tree planting being directed by Julia Lester Dillon. In Bibb County two memorial roads will be planted so as to form the shape of a cross. This will be one of the most unique memorials in the country as outlined by F. Roger Miller, secretary of the Macon Chamber of Commerce. The Woman's Auxiliary of the Chamber of Commerce of Macon is making the plans for this "Road of Remembrance," and Mrs. W. O. Kinney is the chairman of the committee that will plant the trees and gather the data which will enable the American Forestry Association to register the trees on its National Honor Roll. Each tree along the highway extending from Lorane across the county to a point near Dry Branch, and from the direction of Clinton towards Echeconnee, thus forming the cross, will bear on a metal plate the name of a Bibb County man who entered some branch of war service. Gold stars on some will indicate those who died in the service. Relatives and friends of the "heroes" will be given the privilege of furnishing the trees and markers, and the property owners will be asked to co-operate in planting the memorials. That is the way to interest the public in a real way in road building. Give them a real intimate part in the road. Make it, through memorial tree planting a "Road of Remembrance" and therefore their road.



Courtesy the DuPont Magazine.

DELAWARE ROCK FOR DELAWARE ROADS

General Coleman DuPont has given four million dollars for good roads work in Delaware, and a systematic plan of roadside tree planting has been worked out by Samuel C. Lancaster, the engineer who built the Columbia River Highway.

At York, Pennsylvania, the Woman's Club has undertaken the planting of memorial trees along the Lincoln Highway. Mrs. John B. Hamme, the president of the club, has organized the county for "tribute tree" planting to make this stretch of the famous highway a "Road of Remembrance." In her plan, which may well be followed by similar organizations, she says:

"There is a general movement to plant trees as the most fitting memorial to the boys who so nobly laid aside their own interests to fight for our homes, our country, and liberty in the great World War. The Woman's Clubs of the United States have undertaken the planting of trees along the Lincoln Highway from the Atlantic to the Pacific Coast. The Woman's Club of York started the movement to plant trees from Wrightsville to the Adams County line, the York County portion of the Lincoln Highway, which will eventually be one of the great roadways of the world, as a tribute to all the York County boys who served in the great war. The plan is to plant the roadway on both sides with very long-lived, deep-rooted trees, set about 100 feet apart, and to mark a tree for each of the 220 boys who gave their lives, and to mark the roadway at either end in some way to show that the whole planting is a tribute to all who served, living or dead. The trees chosen are red oaks, American elms, sugar maples and tulip trees. Two dollars and a half plants a tree, an additional dollar marks it for some fallen hero with a small bronze plate giving his name and department of service. In the price of the tree is included the replacement of the tree, should it die, and expert care of it for a year. Every loyal citizen of York County will do all he can to further this avenue of Tribute Trees, this 'Road of Remembrance,' which not only honors our soldier and sailor lads, but also adds to the comfort and pleasure of all, and to the beauty of our York County. This is distinctly a community project."

An organized plan of campaign now, such as we have in Delaware and on the part of the women's clubs in co-operation with the American Forestry Association will result in a memorial such as the doughboy never dreamed when he embarked for France on the great adventure. He will have made his country a better place in which to live, and that is what he fought for. These highways of civilization offer the great opportunity. Our methods of transportation have progressed at an astonishing rate, but, peculiar as it may seem, the roads have remained unadorned through all these years. Shall we beautify our roads as we build and find outselves in the years to come with a nation-wide memorial in which trees—man's greatest friend—shall have the greatest part? Perhaps somewhere a memorial road can be built in honor of Jean Frederic Oberlin, who long years ago saw good roads as the solution to many problems.

THE AMERICAN LEGION FOR MEMORIAL TREES

MANY comrades of members of the American Legion have "Gone West" but now trees-living, growing memorials of their heroism, are being planted as a sign that their comrades have not forgotten. In the opinion of many Joyce Kilmer, the poet, never did a greater thing than when he wrote "Trees." It was not long afterward that he died in the service of his country. Kilmer's little poem has become the inspiration for tree planting on a scale of which even he never dreamed, for now the American Legion has coupled its forces with the American Forestry Association in memorial tree planting. The word has gone out to every post, in every part of the world where there is an organization. This letter has just come to the Association from American Legion headquarters:

Mr. P. S. Ridsdale,
The American Forestry Association,
Washington, D. C.

My dear Sir:

Allow me to acknowledge and to thank you for your letter dated March 31, also for the copy of your March number which is being forwarded under separate cover.

In view of your previous letter and the desire of National Headquarters to co-operate with you in the great work that your Association is rendering, I am pleased to be able to enclose a copy of Organization Bulletin No. 38 with its subject "Trees as Memorials." This bulletin, I may say, has been forwarded to every State Department in the Union as well as to all our possessions and to the Department in foreign lands wherever they are established. Assuring you of the desire of National Headquarters for a continuation of hearty co-operation, I am,

Sincerely yours,
RUSSELL G. CREVISTON,
Director of Organization.



National Photograph Company

PRESENTATION OF THE MARKER

Mrs. Walter Reed presents the bronze marker for the memorial tree at Walter Reed Hospital to Lieut. Paul Foote, commander of American Legion Post 21.

The Bulletin No. 38 the letter mentions as having been sent to every post follows:

THE AMERICAN LEGION NATIONAL HEADQUARTERS

MERIDIAN LIFE BUILDING, INDIANAPOLIS, INDIANA

BULLETIN

Organization
No. 38

Subject: Trees as Memorials.

The several Department Adjutants are urged to notify their several Posts that should they desire to include the planting of trees in their memorial activities, valuable information can be obtained by communicating with the American Forestry Association whose address is 1410 H Street N. W., Washington, D. C.

At the same time advantage should be taken of this opportunity to emphasize the fitting part played by the proper setting of memorial trees to any form of memorial as well as to encourage both the protection and preservation of all trees now growing within our cities.

Due to the great interest that is being displayed throughout the entire country and to the many instances where trees are being planted in this relation, the American Forestry Association is compiling a National Honor Roll for all Memorial Trees. In order that the American Legion may co-operate in a very worthy project, the several Department Adjutants are urged to request that where their respective Posts have taken any active part or know of instances in the community where trees have thus been planted, that full particulars be forwarded to the American Forestry Association at their address given above.

FRANKLIN D'OLIER,
National Commander.

One of the first posts to plant a memorial tree is American Legion Post 21 at Walter Reed U. S. A. General Hospital in Washington, D. C. Marking the anniversary of the declaration of war against Germany the Post planted a maple on the main drive just across the sunken garden from the administration building. Mrs. Walter Reed, widow of the famous Army surgeon, for whom the hospital is named, presented for the American Forestry Association a bronze marker to be placed in concrete near the tree. The marker was presented to Lieutenant Paul Foote, of Montana, commander of Post 21. The committee representing the American Forestry Association was Mrs. Reed, Mrs. Richard Cook, her daughter, the wife of Colonel Cook, Major-General George A. Richards, Major W. F. Bevan, Major R. W. Shufeldt, Carl A. Droop, all members of the Association. Behind the Fort Myer Band, Colonel James A. Glennan and the hospital staff, followed by the American Legion Post and nurses all in uniform, marched from the administration building to the tree where a hollow square was formed. Here Mrs. Reed presented the marker to Lieutenant Foote and helped to shovel earth over the tree while an appropriate program marked the ceremony.

On April 26 the Tuscaloosa, Alabama, Post of the American Legion dedicated 29 trees in memory of their comrades. At this ceremony the United Daughters of the Confederacy and veterans of other wars had part. The

trees are planted on University Avenue in a double row thus forming an avenue of trees that connect the University and Tuscaloosa. Fred. R. Maxwell, Jr., of the Post, was the chairman of the tree planting committee. Another tree planted in Alabama was for Lieutenant Pilot Meredith Roberts, who was killed flying over the enemy lines. The tree was planted by the Pelham Chapter of the United Daughters of the Confederacy. All these trees are being registered on the national honor roll the Association is compiling.

CHILDREN PLANTING TREES IN JERUSALEM

Recent news dispatches make the following announcement:

Three thousand school children of Jerusalem, celebrating the Jewish Arbor Day recently, planted 500 trees in the suburbs of the Holy City, inaugurating the afforestation program of the Zionists to plant a million trees this year in Palestine, according to a report from the Zionist Commission in Jerusalem.

During 1919, 369,000 trees were planted in the effort to restore Palestine's forests, wantonly destroyed by Turkish misrule and by the war. The afforestation of Palestine, because of its importance in the agricultural rejuvenation of the country and in providing lumber for construction work of the future, is considered one of the most important projects that the Zionists are attempting in the Holy Land.

The reports of plantings are coming in from every section of the country. California is making a fine record. The San Francisco Native Sons and Native Daughters of the Golden West celebrated Arbor Day by planting thirty-seven California oak trees along the State Highway at Ingleside Terrace. The planting was in honor of thirty-seven fallen heroes. A post was placed by each tree bearing a brass plate with a suitable inscription and the name of the hero in whose honor the tree was planted.

The Lodi Women's Club, Civic Section, planted trees along the State Highway near the entrance to the town for a distance of nearly a mile. Oriental plane trees were planted upon the recommendation of the State Board of Forestry. The Board of Forestry also furnished instructions for planting and supporting the young trees. The State Highway Commission will see that the trees are properly watered. At Fernley,



National Photograph Company

PLANTING THE MEMORIAL TREE AT WALTER REED HOSPITAL

Following the presentation of the bronze marker for the memorial tree planted at Walter Reed, U. S. A. General Hospital at Washington, D. C. by Mrs. Walter Reed, the widow of the Army surgeon, Chaplain Daily accepted the tree on behalf of the American Legion Post 21, of which Lieut. Paul Foote is the commander. The tree was placed on the bend in the main drive and overlooking the sunken garden that is opposite the administration building. The landscape plans are being made by Prof. David Lumsden of Cornell.

California, the school children observed Arbor Day by planting an American prune tree in honor of Robert Beyer, a Fernley soldier who made the supreme sacrifice during the war. The Women's Civic Club, of Wheatland, planted four memorial trees on Arbor Day. The trees were planted on the school grounds, with the children of the school taking part in the exercises. Trees were planted in honor of McKinley P. Brook, Milton McCurry, Claude Boswell and Wilton McDonald.

A sequoia gigantea was planted at Smartsville in honor of Edward J. McGanney, who lost his lift in France, October 6, 1918. The tree planting ceremony on Arbor Day was under the auspices of the Smartsville Farm Center. Fifteen tulip trees were planted along the H Street side of McKinley Park, in Sacramento, by the children of Marshall School. In 1919 the pupils of the same school planted two redwood trees in the park in honor of the soldier dead. Planting of the Big Leaf Maple along the State Highway at Cotati, in Sonoma County, will be continued in the fall. The Cotati Company has been issued a permit to line the highway with trees for a distance of five miles. It is anticipated that the cities of Santa Rosa and Petaluma will continue the planting so that the entire highway between the two cities may be lined with trees. The Chamber of Commerce and Minerva Club of Santa Maria appointed a joint committee which is proceeding with the planting of pepper trees along the main street of the city. Other streets will ultimately be tree lined.

Here are fine examples of pushing the work for "Roads of Remembrance" for which the Association is campaigning. These roads lined with memorial trees will provide not only a fine memorial but a wonderful setting for whatever memorial building or memorial shaft may be adopted by various communities. A feature of the whole work is the way children are taking part in the programs in thousands of places. This means that in the years to come they will know and appreciate the value of trees and will realize the need of perpetuating our forests. Thus the American Legion, the Women's Clubs and the patriotic organizations everywhere are uniting with the American Forestry Association in making this great tree planting work successful.

AN APPRECIATION OF COLONEL GRAVES

IN accepting the resignation of Colonel Henry S. Graves as Chief Forester of the United States, Secretary of Agriculture E. T. Meredith wrote the following letter:

My Dear Col. Graves: Your decision that you cannot, in justice to yourself, continue longer at the head of the Forest Service is one which I have received with the deepest regret. I am compelled to accept it much against my inclination, because I cannot, in fairness to you, do otherwise. The loss of your services, however, is a matter of great moment to the Department of Agriculture, as well as to the public interests which you have so effectively protected and advanced; and I sincerely regret that I shall not have the benefit of your counsel and experience as Chief Forester during the remainder of my term of office here.

"The decade through which you have guided the Forest Service has been notable in accomplishment, and the organization which you have developed to a high plane of efficiency has won not merely respect but the hearty approval of the West, which is perhaps most directly interested in it, as well as the country at large. More and more you have made the National Forests serve the public welfare. Their usefulness has been expanded along lines which make the most of their productive resources, scientifically yet practically, and always with a sound, far-sighted public policy. You have seen to it that they are utilized in helping the home builder, in promoting local prosperity, and in contributing largely to the benefit of the people as a whole. Thus you have given stability and permanence to the public forest enterprise—which means true development as against destructive exploitation. You have handled the public resources in the interests of the many as against encouraging or permitting monopoly by a privileged few.

"You have put the handling of the public forests on a thoroughly businesslike basis from every standpoint. Under severe handicaps and discouragements of a kind unknown in private business, you have secured an admirably trained personnel, developed a system of administration which I believe to be unsurpassed in effectiveness in any branch of the Government, and conspicuously stimulated, by leadership, a spirit of loyalty and devotion to the interests of the public in your organization. At the same time, you have recognized that the work must be based on technical knowledge—that the public welfare must be served by experts and specialists, just as private business is, if public ownership and management of the great public properties under the jurisdiction of the Forest Service are to meet with the highest degree of success. You have, therefore, emphasized the importance of scientific research and of the application of its results in the business of administration. The progress made under your direction in the development of the basic knowledge of forestry and in its practical application has been no less signal than the progress made in the building of an efficient organization and the working out of good business methods.

"You have also carried to substantial completion a great work of land classification, based on sound principles which it became your duty to formulate; so that large areas, in the aggregate, of agricultural lands have been opened to acquisition and conversion into farms, while the lands suited to permanent public ownership and administration for forest purposes have been classified as such—a step in itself of utmost significance for

the permanence of the communities and the resources in question.

"On your initiative primarily a policy of road building for the development of the National Forests and the benefit of the public has been entered upon. During the war not only brought your organization through intact and enabled the National Forests to contribute up to capacity to the war effort of the country, but you employed it extensively in the location of forest supplies of war materials and in the solution of important research problems relating to wartime uses of forest products. You assisted largely, both in person and through the release for foreign service of many of your best men, in solving the problem of wood supplies for the American Army in France. Within the last few months you have taken the lead in a movement which I believe to be of the utmost importance, for extending the practice of forestry to lands now privately owned and stopping the needless and short-sighted waste of a great basic resource through forest destruction.

"These are large services. By wise judgment, energy, vision, and untiring devotion you have rendered them to a degree that has been and is the pride of all your friends. They entitle you to a large measure of gratitude from the public, to whom they have been rendered, and you may justly be proud of the record you have made.

"During the time I have been here I have thoroughly enjoyed my association with you. Whatever may be your plans for the future, you have my best wishes for complete success in any undertaking in which you may engage. I know you are not going to lose your interest in the forestry problems of the Nation and that the department and the Forest Service will have your co-operation and counsel in the discharge of their responsibilities for the maintenance, development, and sound utilization of our great forest resources."

AN UNUSUAL YOUNG EUCALYPTUS

BY ABBOT KINNEY

THE photograph of the tree with Mr. S. Barker on the right and Mr. George J. Cleveland on the left is that of a blue gum (*Eucalyptus Globulus*), planted in October, 1918, when it was eight inches high, and photographed in the first week of February, 1920. One year and four months after planting, it was twenty-two feet in height. It is especially remarkable in still maintaining the seedling form of growth in stem, opposite leaves and in blue-white color of leaves.



THE OVERGROWN YOUNGSTER

Though only one year and four months old, this eucalyptus (blue gum) is 22 feet high. It is growing on the banks of the Grand Canal, at Venice, California.

The mature blue gum has round stems and alternate sickle-shaped leaves of a heavy green color. The photograph herewith shows the difference though it does not show the striking blue color of this tree that has been maintained in continuation of the seedling form.

A large number of species of the Eucalyptus have been introduced into California and are growing well in the State. Of these the *E. Globulus* is the source of the standard Eucalyptus oil and of all medicinal preparations based on Eucalyptus. The fact that the Globulus is planted in groups or groves in California makes the collection of leaves for the oil easier and cheaper than where the leaves must be taken from trees scattered in the natural growths of Australia and Tasmania.

Mistakes in distilling oil from other species of the gum is, in California, entirely absent. A large number of the gums contain no eucalyptol whatever in the oil from the leaves.

SEEDS FOR GREAT BRITAIN

THE shipment of American forest tree seeds, donated by the American Forestry Association to Great Britain to aid in reforesting sections of woodland and timberland cut down during the war have reached England.

The following letter of acknowledgement has been received from Hon. A. G. Herbert, Secretary of the Forestry Commission:

"I am directed by the Forestry Commissioners to say that they have now received the consignments of forest tree seeds presented by the American Forestry Association to Great Britain.

"These seeds will be of great assistance to the commissioners in carrying out reafforestration operations in this country, particularly in view of the prevailing shortage of tree seeds, and I am to ask you to be good enough to convey to the members of your Association the sincere thanks of the commissioners for this valuable gift."

FORESTRY, LIVESTOCK AND CUT-OVER LANDS OF THE SOUTH

BY THOMAS P. IVY

THE shortage of wood pulp and the high cost of building materials prove without the aid of statistics that we have cut and destroyed our forests far below the margin of national safety. The price of beef and shoes is a sure sign that our cattle grazing lands in the West have been so encroached upon by agriculture that other sections must make up the deficiency in western pasturage if the supply of livestock is to keep pace with the increase in population.

In casting about in search of a solution of the future supply of cattle and timber the Southern States have



COUNTY ROAD THROUGH PINE FOREST

This stand in Irwin County, Georgia, shows the kind of timber which can be grown on cut over lands in the South.

attracted attention on account of the vast area of cut-over lands there that has within it possibilities of the widest and highest value to the people of the whole United States. That portion of the Southern States known as the Coastal Plain has conditions which are most favorable for the development of the cattle industry in conjunction with reforestation, provided there is applied to the problem a well defined national policy that will enable the owners of these lands through Governmental financial aid to develop their holdings in accordance with their best possibilities.

The Coastal Plain extends from Norfolk, Virginia, to Galveston, Texas. If we except southern Florida, which is largely prairie with here and there clumps of cyprus and cabbage palmetto, and the Mississippi delta in Louisiana, the soil, flora, the rainfall and other climatic conditions are quite uniform throughout this area. Originally it contained enormous forests of pine, of which the two leading species were longleaf and slash pine. These forests because of the cheapness of logging and lumbering the year round and the high value of the timber for all construction purposes have sustained a vigorous attack from the lumbermen for the past twenty-five years. Only remnants of that great forest are now to be seen, mainly in Florida, Louisiana and Texas. According to a bulletin recently published by the Interior Department, the several coastal states have in them the following acreage of cut-over lands:

State	Cut-over lands	Area of State
Texas	12,000,000 acres	167,000,000 acres
South Carolina	9,500,000 acres	19,516,000 acres
North Carolina	13,000,000 acres	31,200,000 acres
Mississippi	13,500,000 acres	29,675,000 acres
Louisiana	12,000,000 acres	29,062,000 acres
Florida	12,500,000 acres	35,100,000 acres
Georgia	21,000,000 acres	37,584,000 acres
Alabama	15,000,000 acres	33,000,000 acres
Total	108,500,000 acres	382,137,000 acres

According to these statistics nearly 30 per cent of the total area of these states, or an acreage greater than the



CATTLE GRAZING AND FORESTRY

In this longleaf pine forest in Baker County, Florida, cattle are raised at a profit in addition to that secured from the forest.

combined acreage of Alabama, Florida and Georgia, is cut-over land. Most of this acreage is held in large tracts by lumber companies, one corporation owning, in western Florida, more than 300,000 acres. In this unproductive acreage is locked up probably the most important economic problem that now confronts the people

of the United States. How shall that problem be solved and how shall these lands be developed?

The many schemes of colonization that have been projected and failed would seem to eliminate that possibility. In the light of the experience of what has been accomplished in the past decade there appear to be three solutions of this great problem being worked out by different men or corporations in different localities or states without any general concert of plan and purpose. The three solutions thus in process of development might be classified as follows: Livestock ranches, reforestation and livestock farms.

In cattle raising it has been found that one thousand head is as small a number as will permit of the highest economy in management and one hundred thousand head is regarded as the largest number in Texas that ought to be under one management on one ranch. As yet nowhere on the Coastal Plain are there any cattle ranches except on the everglades and prairie lands of southern Florida. There the industry has assumed considerable proportions and so far as can be learned from observation has proved profitable. Perhaps one of the largest herds, about 30,000, is owned by the Consolidated Company of Jacksonville. In southern Florida ten acres per head is allotted as ample pasturage, and on that acreage cattle thrive the year round. All the management has to do is to protect the herd against diseases and ticks and to cross-breed with strains that will give a vigorous and large type even in that climate. Of course, if for the two months of the year when the pasture is leanest these cattle were fed a pound of cotton seed meal or other grain per day, it is beneficial.



A DIPPING VAT

A necessary treatment by which cattle are protected against ticks.

In regard to the second solution, reforestation in conjunction with cattle raising, opinion is divided in the bureaus of the Department of Agriculture where the subject has been investigated. In a general way it appears that the livestock and forestry experts believe the plan practical, but some of the plant specialists are doubtful whether grass can be grown sufficiently under trees to furnish pasturage. And yet tradition says that in these primeval forests on the Coastal Plain grasses grew so high that cattle could not be seen when grazing. So far no experiments have been conducted that would justify a conclusion for either side, but the facts in the situation present an interesting study. In the first place the proper handling of this enterprise would require a man who was both an expert forester, lumberman, and livestock man. In many instances lumbermen have herds on their cut-over lands but here the cattle industry is entirely secondary to that of lumbering, is given no expert management, and so furnishes no data that would be reliable. In working out this problem no rules and regulations of general application can be laid down. Each area must be treated in accordance with the conditions found on it. We can approximate in a general way what should be the results.

As a starting point, grant that one thousand head of cattle is the unit of economy. For grazing purposes, allotting ten acres per head, a tract of ten thousand acres would be required. Such a tract located anywhere on the Coastal Plain would consist of flat wood lands, high pine lands, muck, hummock, scrub, swamp and, if in southern Florida, prairie lands. The first two will constitute the area for reforestation in pine and would probably amount to three-fifths of the entire tract. The remaining two-fifths would be made up of one or more or all of the other descriptions. These four thousand acres should be treated not as forest lands primarily, but as pasture lands. Shrubs that cattle browse and canes for winter evergreens should be introduced to take the place of growth not useful on pastures.

By adopting such a policy the pasture value of these four thousand acres could be vastly enhanced.

We have six thousand acres suitable for reforestation. How shall that be done and this area used for grazing? That is the untried and debatable experiment. For reforestation of this area we can use longleaf pine and slash pine, one or both. Since it is a serious drawback to the practice of forestry in this country that the financial returns are so long in coming, we should choose, other things being equal, species that bring the quickest financial returns. With that principle as a guide we should reforest this six thousand acres with slash pine on account of the rapidity of its growth, its greater rosin product and the further fact that it is almost equal in timber qualities to longleaf pine. Tables furnished by the Forest Service show slash pine yields in cords of pealed pulp wood per acre: 12 cords when 13 years old, 25 cords when 19 years old, 34 cords when 21 years old and 40 cords at the age of 27 years.

If we should decide upon a pulp wood rotation of twenty-one years we would have in value per acre from pulp wood, taking two dollars per cord as the price, sixty-eight dollars. From this same stumpage three years before cutting we could take a value in turpentine and

rosin based on the following actual figures for operating ten acres:

1,000 cups and gutter lines	$100.00
Three-year lease on this amount of timber	100.00
Labor for installing	10.00
Labor for working one season	71.25
Stilling amount gum gathered	6.00
Spirit barrels and rosin barrels	25.00
Total cost of operating ten acres one season	$312.25



USE OF CUT OVER LANDS

Cut over lands of practically no value are made valuable when used by sheep for grazing, as is this land of the Southern Lumber Company in Louisiana.

A low estimate of the yield per year for operating these ten acres would be: Three barrels of turpentine worth $225, and ten barrels of rosin worth $250, or a total of $475. This would give a profit of $162.25 for the first year. The yield of the next two years would not be so large, but as there would be no lease charges for those two years the net profit would be equal to the first year. From these figures a profit of $50 per acre for the three-year period is apparent and this added to the pulp wood gives a profit of nearly five dollars per acre per year throughout the pulp wood rotation of twenty-one years.

In the meantime what has become of our one thousand head of cattle. Has the reforestation of the six thousand acres lessened their pasturage? Here again only an actual experiment can give the desired information. But it seems probable that the first third and the last third of this period of twenty-one years would furnish open space enough for good pasturage and that probably the intermediate third might be too shady for the best pasturage unless some shade loving grass is found to keep an even pasturage throughout the whole rotation.

As to the profits of the cattle industry thus conducted there are no available figures. The nearest approach to anything of the kind are the experiments conducted by Mr. Henry E. Hardtner, of the Urania Lumber Company, for the Louisiana Experiment Station at Urania, Louiasana. Mr. Hardtner puts forth the following ledger account of the business on a cut-over tract of fifteen hundred acres:

1,500 acres at $4.00 per acre	$6,000
150 head of cattle	4,500
Barn	500
Roads	100
Fences	1,750
Total investment	$12,850

ANNUAL COST OF OPERATIONS

Supervision	$300
Taxes	150
Interest at 7 per cent on investment	900
Winter feed for cattle	900
Total	$2,250

ANNUAL RETURNS

Sale of fifty head cattle	$2,000
Sale of fifty cords of wood	250
Total	$2,250

Using these figures as a basis we should have to sell from the herd of one thousand annually three hundred head, and at $40 per head, this would give a gross return of $12,000, or a net annual profit of $3,900 on a herd of one thousand head.

The third method of utilizing these cut-over lands on the Coastal Plain is as farm lands for cattle farms where the food is grown for the cattle by cultivation of the soil as distinct from the ranch method of southern Florida where native forage supplies the food. Mr. D. J. Renfroe, of Thomasville, Georgia, is the most conspicuously successful of the cattle farmers on the Coastal Plain. When he began his experiments a few years ago, these open old field lands around Thomasville could be bought for ten dollars per acre. Today the price of the same type of lands in that locality is forty dollars per acre, due largely to Mr. Renfroe's success in cattle farming. Mr. Renfroe got his



EXPERIMENT FARM OF S. W. COLONIZATION AND DEVELOPMENT COMPANY

Hampshire pigs raised on fenced pine land with oats for winter grazing, will be fattened on peanuts and hardened on corn. Jasper County, Texas.

results by converting these old fields into permanent pastures through the introduction of grasses and legumes that yield forage the year round. Carpet grass called by some the blue grass of the Coastal Plain is the largest factor in Mr. Renfroe's experiments. Instead of ten acres per head Mr. Renfroe's pastures carry one head of cattle per acre. As pasture lands the year round there is no doubt that the Coastal Plain can be made superior to any other part of our country.

To recapitulate. The total of these cut-over lands in the coast states of the South, from Texas to North Carolina, inclusive, was 108,500,000 acres, or an area larger than the combined area of Alabama, Georgia and Florida. On the lowest estimate, that of ten acres per head of cattle, this area would pasture annually ten million eight hundred fifty thousand head of cattle. According to the January report of the Department of Agriculture there are in the United States a total of milk cows and other cattle of 68,132,000 valued at $3,936,256,000. By the same statistics there is in the Coastal Southern States which have been considered in this article a total of milk cows and cattle of 12,744,000 distributed as follows: North Carolina, 722,000; South Carolina, 460,000; Georgia, 1,232,000; Florida, 1,101,000; Alabama, 1,244,000; Mississippi, 1,287,000; Louisiana, 1,102,000; Texas, 5,596,000.



GOATS ON CUT OVER LANDS

Another use to which cut over land has been put by the Great Southern Lumber Company at Bogalusa, Louisiana.

The cut-over lands in the Coastal Plain of the Southern States can be made to furnish pasture to carry one-sixth of the total cattle now in the United States, and five-sixths of the total number now in the Coastal States of the south from Texas to North Carolina, inclusive. At the same time three-fifths of these now idle lands could also be made to grow timber at the rate of ten thousand board feet per acre at the end of a timber rotation of fifty years provided that lumber is desired instead of pulp wood. In the meantime there would be the income from the several turpentine operations that could be carried on during this rotation.

Therefore, this is a problem that appeals to the nation for help in its solution and the solution can only be reached by a vigorous co-operative state and national policy that aims to find the right man to handle every acre of this cut-over land in accordance with its site and soil demands and protect him in his business by enforcing the laws against fence-cutters and fire-starters. The first step, therefore, would be a forest and soil survey of every acre so that no mistake might be made in trying to do something for which neither the soil nor the climate is adapted. The second step would be for the Government to broaden the Farm Loan Act so that financial assistance could be extended to the men engaged in converting a waste area into forests and fields that would produce food and shelter for one-sixth of the entire population of the United States. How much such assistance would accomplish can be measured by what has been done in the South in the last ten years without Government financial assistance. The increase in cattle has been thirty per cent since 1910 and in hogs nearly seventy-five per cent.

Of twenty leading hog producing states ten are southern. Georgia is in the forefront with a total of 3,165,000 swine and is surpassed by only six northern states. Furthermore, in 1910 there was not a packing house on the Coastal Plain from Norfolk to New Orleans. Today there is a packing house in nearly every two hundred miles of this territory.

M. M. BURRIS, formerly City Forester of Trenton, N. J., has resigned to become one of the firm of Black, Burris & Fiske, Inc., consulting landscape architects and foresters, with offices in the Broad Street Bank Building, at Trenton. Mr. Burris acted as City Forester for Trenton for more than two years, and his work during that time speaks for itself. He carries with him the best wishes of many friends for success in his new field of endeavor.

THE following applied for life membership in the American Forestry Association in March and were elected:

Julian Wood, Pennsylvania; William R. Webster, Pennsylvania; Mrs. Hallie Davis, Elkins, District of Columbia; Mrs. Z. Chafee, Rhode Island; Pine Tree Manufacturing Company, Minnesota, and George E. Matthies, Connecticut.

CALL EDITORS TO UNITE FOR FOREST POLICY

HARD pressed by the newsprint shortage the newspapers from all parts of the country are calling for action on a national forest policy under the banner of the American Forestry Association. Various editorial views of the editors follow:

Louisville Courier-Journal: The newspaper cannot use substitutes for paper!

Pulpwood is being sold at $25 a cord in Canada. Pulpwood is being shipped 500 miles to mills, and paper is shipped much further to consumers. Within twenty years, in the opinion of the American Forestry Association, the pulpwood supply of New England and the Lake States will be about gone. Forestry, as a national enterprise, as a State enterprise, as a project of private owners of lands, must be undertaken vigorously that the supply of the kinds of timber suitable for paper making and the more numerous varieties suitable for lumber shall be renewed faster than consumed.

Salt Lake Tribune: The American Forestry Association of Washington is campaigning for a national forest policy and will get it if the right kind of men are elected to the two Houses of Congress. Under present conditions, the newspapers of the United States are experiencing great difficulty in supplying their readers with the news of the day, owing to the shortage of print paper. According to figures given out by the Forestry Association, this is what has happened to the pulp wood industry:

The use of pulpwood in the manufacture of news-print paper has been developed only in the last fifty years. Of all the paper used in the United States, 22 per cent is used by the newspapers.

Before the war, news-print paper sold for about two cents a pound, now it sells in large quantities for five cents a pound, and in small quantities up to ten cents a pound.

Evidently it is high time we adopted a national forest policy. There has been entirely too much waste in times past and the work of reforestation has not been prosecuted as vigorously as it should have been. The problem is one of great moment, and should not be sidetracked by senators and representatives in favor of questions which smell of politics. The newspapers of the country should unite in demanding action. Relief will come quickly enough if pressure of this kind is applied.

Rochester Democrat and Chronicle: Those who wonder why the price of paper is so high, and why it seems to be going higher all the time, can find an answer to the questions in their minds from some statistics made available by the American Forestry Association. This organization is campaigning for a national forest policy.

While the news-print shortage is a problem of great magnitude in itself, it is but one factor in the forest equation. The fundamental fact that must be borne in mind, and the basis of the Forestry Association's campaign, is that the forests are rapidly disappearing. If nothing is done to replace something of what is gone and conserve that which remains, the time is near at hand when timber for all purposes will practically be unobtainable. It is against this deplorable condition that the Forestry Association's campaign is directed. It deserves universal support, and it is to be hoped that it will be successful.

Gadsden, Ala., Journal: Why are the rates, circulation and subscription, for newspapers advancing? Because of the scarcity of news-print paper. Why is news-print paper becoming scarce? Answer to the latter question is given in a convincing manner in a bulletin issued by the American Forestry Association. The remedy lies in several directions. In the first place, there must be further conservation of the present supply of paper. Then, there are the methods suggested by the Forestry Association, as follows: by developing the industry in the Northwest and in Alaska; by perpetuating forests in timber in them; possibly by the collection and repulping of newspaper and its reuse by mixing with it new pulp.

Watertown, N. Y., Standard: Some startling statements were made at a recent meeting of the American Forestry Association. The most surprising was the declaration of President Charles Lathrop Pack that 25 to 30 years is the limit of which our forests will hold out under the present drain. As alarming as this is, the country is paying but little attention to it. In 1904, President Roosevelt gave the first clarion call for woods conservation. Sixteen years have passed, but this government as yet has no definite forestry policy. It is the only civilized country that has none.

Des Moines Capital: AMERICAN FORESTRY Magazine data shows that the raw material that supports a large share of our industries comes from forests. Work is given by the 276,000 manufacturing establishments that use wood in some form, to over seven hundred thousand wage earners.

Manufacturing establishments using wood pay out annually over a billion dollars for raw material. The value of the wood-using industries is slightly more than doubled by the process of refinement at the hands of more than a million wage earners.

These are huge figures and their very magnitude makes them difficult of ready perception. But in no other way perhaps can the greatness and wealth represented by the wood-using industries of the country be pointed out. One inhabitant out of every 100 forming the hundred million population of the United States is a wage earner whose earnings depend upon the uninterrupted supply of raw material from the forest.

Indianapolis News: The donation by the American Forestry Association of 35,000,000 tree seeds to Great Britain, France, Belgium and Italy for the rehabilitation of forests sacrificed in the war, is a noteworthy episode in America's post-war relations with Europe. The recipients of the gift are reported as deeply impressed with its value. Europe, of course, has long since realized the value of forests. It cut them away for war purposes with the greatest reluctance, and it has set about restoring them as one of the first acts of reconstruction.

It is significant that an association formed primarily for the purpose of establishing a sensible American forestry policy should be able to provide such necessary help to countries that have already proved the value of state supervised forestry activities. In so promptly providing these seeds, the Association has shown that it is prepared to help America, but if America insists on stumbling along in the dark, as it has since attention was called to the condition of its forests, the Association is just as ready to help friendly nations until the United States can be made to see the magnitude of its mistake.

Forty years from now American travelers in Europe will find many forests serving an admirable economic and esthetic purpose upon ground which today has been cut over. They will praise France, Belgium and other countries for their foresight in attending to reforestation as soon after the war as possible. Meanwhile, the United States is neglecting just such an opportunity, but not entirely, for here and there are signs of genuine public interest in forests, and Indiana is fortunate in being among the states which have made a fair beginning toward a definite policy.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

TUSCALOOSA, ALA.

By Tuscaloosa Post, American Legion: Anthony A. Dauser, Ed. Deaton, Perry Edward Doss, Findlay Brown Durrett, William A. Farris, Luther M. Gardner, William Grammer, Joseph Golden Hinds, Charles L. Latner, Anders Laycock, Farley William Moody, Jesse W. McPherson, Jesse Coleman Pearson, William DeVane Pullen, Marvin Randolph, Isaac A. Robertson, William T. Roycroft, William Royal Seay, Lester Jared Snow, Allen E. Turner, George W. Turner, Mitt M. Sullivan, Edward Lawrence Williams, Oscar Cottrell, Willie S. Phillips, Sims E. Partrick, Lewis Edelman, Joe Leach, William Russel.

GRAYSONIA, ARK.

By C. I. C. Class of Sunday School: Ollie Price, Roy Copeland.

OROVILLE, CAL.

By Mrs. A. F. Jones: Albert Foster Jones.

DAWSON. GA.

By Georgia Daughters of Confedercy: John Willis Daniel, J. R. Davis.

FRANCE

By Mrs. Herman Dowd: Lt. Meredith L. Dowd.

CARTHAGE, ILL.

By Mr. and Mrs. W. H. Hartzell: Phillip William Hartzell.

URBANA, ILL.

By University of Illinois: Truman Obet Aarvig, Alvin James Adams, Charles Patrick Anderson, Michael Louis Angarola, Alan Newton Ash, John Willard Bailey, Harold John Barnes, Lloyd Kaylor Bartholomew, Lowell Wilson Bartlett, Bohuslav Bartos, Frank Allyn Benitz, John Stanley Bennehoff, Merrill Manning Benson, Edwards Hall Berry, Benjamin Harrison Bloebaum, Irving Jerome Bluestein, Vinson Runyan Boardman, Arthur Lee Bonner, Marcus Huber Branham, George Ray Brannon, William Edgar Brotherton, Bayard Brown, Waldo Reinhart Brown, John Edward Burroughs, Charles Bowen Busey, Charles Edwin Caldwell, William Joseph Callahan, Jay Ira Carpenter, Leslie George Chandler, Minor Judson Chapin, Harry Leslie Clayton, Paul McKinley Clendenen, Frank Maynard Colcord, Linn Palmer Cookson, Willis Hugh Cork, Bruce Nutter Culmer, Robert Marshall Cutter, Homer Walston Dahringer, John Henry Dallenbach, Theodore Frederic Demeter, David Woods Dunlap, James Edward Durst, Vincent John Dushek, William Franklin Earnest, Adrian Clair Edwards, Elmo Krehl Eson, Emery C. Farver, James Alva Gain, Francis Moses Gaylord, Lloyd Havens Ghislin, Ralph Egley Gifford, Isaac Van Tyle Goltra, Thomas Goodfellow, Algernon De Waters Gorman, Otto Benton Gray, Robert Marion Greene, Julius Elmer Gregory, George Philip Gustafson, Chester Gilbert Hadden, Frederick Hadra, Milo Lincoln Haley, William Jacob Hamilton, John Conner Hanley, Howard Henry Hardy, Everett Leonard Harshbarger, James Burr Hickman, John A. Hirstein, Leonard Cunningham Hoskins, Peter Marion Huisinga, Allen Kirk Hyde, Ralph Imes, Lenton Willis James, Hubert Jessen, Joseph Henry Johnston, Archibald Floyd Keehner, Otis Herbert Kirchert, Robert Dudley Kirkland, Bayard Taylor Klotsche, John Carl Kromer, Edgar Alfred Lawrence, Theodore Edwin Layden, John Charles Lee, Raymond George Leggett, Oscar Edwin Landsea, Everett Robertson Leisure, Lester Ray Lewis, Wilfred Lewis, Leslie Alvin Liggett, John Royer Lindsay, Robert Lewis Long, Clare Parsons McCaskey, Louis Douglas McCaughey, Isaac Frost McCollister, Leo Glenn McCormack, Joel Fumas McDavid, John McDonough, William Howard Mandeville, Lewis Vinton Manspeaker, Leo Joseph Mattingly, Dean Ellsworth Memmen, Alexander Val Mercer, Russell Micenheimer, Donald Joseph Miller, Wayne Kenneth Moore, Guy Edward Morse, William Earle Mosher, Charles Sol Narkinsky, John Lowrie Needham, Ralph Mathew Noble, Thomas Olazagasti, Edwin August Olson, Raymond Webb Parker, Miles McKinstry Parmely, Lloyd Melvin Parr, Clyde Fugate Pendelton, William Chandler Peterson, Louis Irving Phillis, James Blaine Phipps, Eric Frederick Pihlgard, Horation Nicholas Powell, Hugh Mitchell Price, Benjamin James Prince, James Kempt Read, Lawrence Scott Riddle, John W. Sackett, Harold Cordes Schreiner, William Joseph Sense, A. Vernon Sheetz, Carl Lee Sherman, Harold Stein Seibert, Bruce Lucius Sizer, Clarence Walter Smith, Philip Overton Smith, William Everett Smoot, Reginald Gardiner Squibb, Otto Staeheli, Harold Hoyle Sutherland, Dana Elery Swift, Alexander Stephen Tarnoski, John Lawrence Teare, Norman James Tweedie, Charles Arthur Wagner, Elliott Pyle Walker, Edward Wallace, Manierre Barlow Ware, Hiram Hannibal Wheeler, William Erastus Wheeler, Jr., George Edward Wilcox, Lloyd Garrison Williams, Frederic Hance Winslow, Leslie Abram Waterbury, Warren Crooke Woodward, Edith Marian Morgan, Edward Kent Armstrong, Arthur Lewis Beyerlin, Albert Charles D'Vorak, William H. Gurther, Orlando Merrill Gochnaur, Calvin W. Hesse, Samuel Brody Leiserwitz, Leo Cassius Miller, Harry Henry Strauch, Burt Hamor Ward, George Lynn Weaver, Roy Wayne Purdum, Harold Charles Buchanan, Charles Le Roy Gustafson, Lynn Elmer Knorr, Alfred Thorpe Morison, Ralph Waldo Tippet, Cyril George Hopkins, Charles Henry Gundlock, Charles Leslie Starkel.

LAFAYETTE, IND.

By Service Star Legion: Edward Foresman, Arthur O. Leaf, W. J. Memmer, Chester Platt, Otho Rector, William Deets, Russell Kent, Chester Deboy, Walter Behrens, James O'Connor, Robert Morse, Anthony Wilken, William Rosa, Ralph Hill, Roy E. Hart, Henry Obermeyer, John W. Frank, Mahlon Unger, Frank Campbell, T. E. Bigelow, J. Vernon Raymond Reitemeyer, Wallace McGuire, Frank Baer, John Hendrickson, Herman Kolkona, John W. Vestor, Edward Harty, Harry Rock, Thomas Geinstrom, Corbin Brankam, Elmer Rothenberger, Clarence Booch, S. F. Shaffer, Carl Shutz, Fred Phillips, Harry Messenger, Ralph Ray, James Bowsher, Emil Wiser, Robert McGrath, Robert Wagner, Frank Ostheimer, George Rogers, John Sherlock, David Fisher, Theodore Baumgardt, W. J. Corringham, William Owens, Lloyd D. Tschapt, Mike Beeker, Robert Coleman, James Halloway, Ernest Levering, Charles McKinney, J. F. Buckley.

WASHINGTON, IND.

By Washington Rotary Club: William H. Wood, Elmer Ishum, Clarence R. White, Mack Burch, Richard Whisman, Ray Allen, Harry E. Elswick, Eugene Paul Smith, Earl Edwards, James McPherson, Joseph McCriskan, Silas M. Spaulding, William Thomas, Bernard Norris, Austin Wood, Daniel V. Taylor, Jeptha C. Potts, Carl F. Mandabach, Emil Mattingly, Clarence Brothers, Crystal McCord, Clarence S. Asdall, John F. Peterson, George Flick, Thurman Dalton, William C. Cissell, Frank Lechner, Hollis Ray Goodwin, Earnest Ezra Bryer, William Henry Potts, Frank Falvian Doane, John Bryer, Jefferson V. Vincent.

OSKALOOSA, IOWA

By Service Star Legion: Harry Anderson, Tommy Arkless, Samuel Allison, William M. Boyd, Wilford M. Bauder, Wells Besco, Donald Blakely, Dwight Bardley, Paul Coffin, Roy E. Crotinger, James Walter Collier, Frank Lacey Davis, Eldris Dales, Chas. H. Daily, John Daly, William Davidson, Homer Deutschman, Clifford Ervin Evans, Raymond Edwards, Edwin J. Evans, Raymond Eaton, Carl Endgreen, Cecil Freeman, Raymond Fuller, Virgil Guthrie, Thomas Garrington, Daws Hammond, Harry Hart, Wilbur Clifford Johnson, David F. Kirk, Ernest L. Kent, Virgil Knight, Edgar Linderman, John L. Linderman, Edward Marcus Lewis, Walter Clarence Minor, Floyd A. Moore, Harold Dale Mellott, Howard Martin, Sol Morris, Charles A. Marks, Cornelius B. McCabe, Fred Mathes, Glen Morrow, Harry Middleton, Perry Newton, Paul Noel, Harold Nichols, Phillip Plaster, Hollis T. Page, Manford Pearson, John Porter, Harmon Roy Stringfellow, Irwin L. Sears, Herbert J. Sarvis, Paul Scott, Joseph Slavenaker, James E. Smith, William Short, Clifford Taylor, Louis Turner, Forrest C. Ufford, John Van Veen, Gilbert Van Maanen, Joseph Willard Whitcomb, Gilbert Woods, Hugh Stanley Newell, Charles G. Russell, James P. Hoeller, Jacob M. Bolsom.

ARKANSAS CITY, KANS.

By Community Service Council: Albert Hestwood, Corp. Isaac Frantz Scott, Shelton Beaty, Capt. John T. Bossi, Corp. Roy Brown, Ivel L. Bracher, Angus Ralston, Charles Brown, Lawrence Vernon Boaz, Clovis Mattingly, Everette Kirkpatrick, Delbert Buck, Ephraim Love, Omar Curtis, Thomas Fleming, Arthur H. Gilliland, Algie McKinney, Earl Marshall, Lawrence Ward.

SPARKS, MD.

By Halten Garden Club of Baltimore County: Sgt. Charles H. Bruehl, Samuel Edwin Wilhelm.

MANTEE, MISS.

By Mantee School: Grady Durham.

ARLINGTON, N. J.

By Mrs. J. E. Frobisher: Lt. Joseph Edwin Frobisher.

Build Roads of Remembrance

MAY 17 to 22

Ship by Truck FOR SHORT HAULS

MAY 17 to 22

THE AMERICAN FORESTRY ASSOCIATION

Calls Ship By Truck Week, May 17 to 22, the big opportunity for putting before the public the idea of tree planting along the highways of the country and thereby making a magnificent and long-lived memorial in honor of our country's heroes.

Put the idea of Memorial Tree planting plan of the American Forestry Association before the committee in charge of Ship By Truck Week in your town.



WHICH DO YOU LIKE BEST?

Trees on one side of the road, or telegraph poles on the other.

Telegraph poles or trees? This road shows what can be done in beautifying them as we build the roads for the trucks of modern transportation.

The Great Burden of the Highway Is Civilization

The American Forestry Association, Washington, D. C., will furnish anyone, free of charge, an attractive bulletin on how to select, plant and care for trees on streets, roads, highways and elsewhere.

POISON IVY, OAK AND SUMAC

THE best ways to avoid ivy and sumac poisoning, the most practical means of eradicating these noxious plants, and the most approved method of treating cases of such poisoning have been the subjects of an investigation conducted jointly by the United States Department of Agriculture and the Public Health Service



POISON IVY

This is also known as poison oak. It should be carefully avoided and wherever possible the plants should be destroyed.

of the United States Treasury Department. Despite general belief there is good reason for believing that absolute immunity from ivy and sumac poisoning does not exist, investigators state. They also found that many common methods of treatment are not to be commended.

Poison ivy is sometimes called poison oak. Poison sumac is also known in various localities as poison dogwood, poison elder, poison ash, thunderwood, and poisonwood. These poisonous plants are widely distributed. While no accurate estimates can be made as to the economic losses resulting from poisoning, the total is very great, and there is urgent need for widespread campaigns to eradicate these noxious plants.

If one must handle these poisonous plants, gloves, preferably of rubber, should be worn. After the gloves have been removed they should be thoroughly washed with soap and water and rinsed several times. Inasmuch as the clothing which comes in contact with the leaves may be a source of infection for a considerable period, care should be taken in changing the garments, and also the shoes. Many cases of poisoning have resulted merely from contact with exposed clothing.

One of the surest and best methods of minimizing or preventing infection after the hands, face, or other parts of the body have been exposed, is to wash and rinse them repeatedly with an abundance of good kitchen soap and hot water. The poison, after being deposited on the skin, requires some time to penetrate, and if this penetration can be prevented by thorough washing, eruption and



POISON SUMAC

This poisonous leaf, also known as poison dogwood or poison elder, grows on moist ground and in swamps. They can be readily distinguished from the harmless Sumac and species of ash elder and other shrubs with somewhat similar foliage.

irritation will not result. While exposed parts should be cleansed in this manner as soon after exposure as possible, it is worth while to make the attempt even 12 or 20 hours afterwards in the hope that at least a portion of the poison may be removed. A heavy lather should be produced and the washing should be continued several

minutes. Severe scrubbing with a brush is not advisable, but several swabs or small compresses of gauze may be used, discarding each in turn, so that the poison may not be distributed by the cloth.

Bathing with alcohol diluted with an equal amount of water is also an effective preventive. Where exposure has been more general, a bath for the entire body, followed by a change of clothing, is a good preventive measure. The hair should not be neglected. Bathing, if not accompanied by sufficient changing of water or rinsing, may result in spreading the rash to skin that had not been infected. In cases that are at all serious a physician should be consulted.

The investigators call attention to the fact that scores of remedies and prescriptions are more or less in popular favor, but in spite of the claims they assert that no specific treatment for poisoning from ivy and sumac is yet available. Ointments should not be used in the acute stage of the disease. In the later stages, however, soothing and astringent ointments may be of value in allaying irritation and hastening cure. The extent to which it is desirable to use solutions of permanganate of potash, hyposulphite of soda, sulphate of magnesium (Epsom salts), and other remedies, is also discussed. Sugar of lead, formerly much used, often proves disappointing if applied after inflammation has developed, and the user runs the risk of lead poisoning if this substance is applied extensively.

The names "poison oak" and "poison ivy" are used interchangeably in many localities. The plant generally known as poison oak throughout the Pacific Coast occurs as a bush, sometimes four or five feet high, and has leaflets resembling the leaves of the western oak, but it is also found as a vine, and is sometimes called poison ivy.

In the East from New Jersey, Delaware, and Virginia southward the name "poison oak" is often used to distinguish from the poison ivy vine, a form occurring as a bush with lobed leaflets, a little resembling the leaves of scrub oak. Westward from Minnesota, Nebraska, and Arkansas to Washington, Montana, Colorado, and New Mexico this name is applied to a low bush or trailing shrub which does not climb. The leaves of all forms have stout, rather long stems bearing three leaflets, two of which are opposite and short stalked, while the third has a long stalk. The leaflets are from one to four inches long, dark green on the upper surface, lighter (sometimes with a velvety covering of fine hairs) underneath, with smooth or somewhat indented margins.

In the Eastern States and westward as far as Wyoming to Texas the Virginia creeper is found generally in the same location as poison ivy vine, which it resembles somewhat in its habits and the shape of its leaflets; but it can be readily distinguished from poison ivy in that its leaves are divided into three to five leaflets to the stalk. Moreover, though it is sometimes supported by aerial rootlets, like poison ivy, it also has numerous tendrils like those of the grape vine, and its inedible fruits are blue, with red stems, and contain two or three seeds.

Poison sumac grows in moist ground, usually in swamps or along low, miry banks of streams and ponds. It occurs from New England to Florida, and westward to Minnesota, Arkansas, and Louisiana. The poison sumac leaves are readily distinguished from the harmless sumac and species of ash, elder, and other shrubs and trees, having a somewhat similar foliage, and the character, appearance, and color of the fruits furnish other simple means of identification. Furthermore, the poison sumac occurs on moist or swampy land, and in drier locations is found only along the borders of swamps or bogs. The number of leaflets into which the leaves of the harmless sumacs are divided range from 9 to 21 and 31, while the poison sumac leaves divide into 7 to 13 leaflets.

While many persons are of the opinion that contact with these plants is not necessary to produce poisoning, it is probable that many cases supposed to have originated in this way have actually been due to direct or indirect contact. There are cases on record showing that the smoke from burning plants will give rise to irritation, and in some cases severe poisoning has resulted from this form of exposure. Regarding the popular belief that some persons are wholly immune, the investigators state that there is good reason to believe absolute immunity does not exist, although it is recognized that some persons are much less susceptible than others.

Eradication of these plants should be widely undertaken and followed up systematically. Every landowner should feel a measure of responsibility in this matter. The simplest method is by grubbing, in which care should be taken to cover the hands properly, and also to prevent infection by means of the clothing.

The plants in fields may be destroyed by plowing them up and putting in cultivated crops. Often repeated mowing is also effective. The use of kerosene is recommended where injury to other plants or trees is not to be feared. It may be applied with a sprinkler or a spraying pump, and in many cases one application is sufficient. Arsenate of soda has been used very successfully to kill poison ivy on trees 6 to 10 inches in diameter without injury to the trees, as well as on stone walls, buildings, and along fences.

INSECTS AND DISEASES WHICH INJURE TREES

In the first place, there is no single remedy for all insect pests. Avoid as unreliable advice recommending "cure-alls."

Many insects cannot be exterminated by spraying, but years of study and experiment have resulted in remarkable advances in methods of control.

Distinguish injury by insects from damage by diseases. Bordeaux mixture, frequently recommended for any injury or damage to trees, does not kill insects; it only prevents and controls damage by disease. Chewing insects are generally controlled by poisoning what they feed on, while sucking insects are only controlled by spraying the insects themselves.

Must Understand Feeding Habits of Insects.

Before using any material for the control of insect pests, determine how the creature secures its food—(1) whether by chewing and swallowing portions of its food, or (2) by sucking the juices of plants through a tiny beak inserted in the plant tissues.

The first group, usually called chewing insects, can generally be controlled by poisoning their food at an advantageous time with some of the well-known arsenical compounds. The work of chewing insects is usually recognized by the ragged or perforated condition of the foliage which is attacked.

The second group, composed of sucking insects, can be controlled by oily or corrosive contact sprays applied directly to the bodies of the insects. It is useless to attempt any control of a sucking insect by the application of a stomach poison either to the surface or in the sap of a food plant. The work of sucking insects is not so easily recognized as that of the preceding group since the affected plants show little external injury. Gradual weakening, wilting or shriveling of the attacked plant is generally evidence of attack by sucking insects.

Most Satisfactory Commercial Preparations.

Insects that suck the juices from plants, foliage, etc., such as lice, green, black and white aphis or fly, mealy bug, red spider and scale, thrust their proboscis into the leaf or stem, and are not affected by stomach poisons; so they must be destroyed by contact insecticides. Those in powder form kill by closing the breathing pores in the insects skin; or in fluid form by being absorbed through these pores. The best contact insecticides in powder form are hellebore, slug shot and tobacco dust. The best in fluid form are aphine, black leaf 40, fish (whale) oil soap, nicotine (tobacco extract), kerosene miscible oil and lemon oil.

Insects that eat plants, foliage, vegetables, fruits, flowers, etc., whether bugs, beetles, worms, caterpillars or slugs, are more quickly and effectually destroyed with a poisonous stomachic insecticide such as arsenate of lead, Paris green or hellebore. These, if applied according to directions, are so diluted as to be harmless to vegetation and to animal life. Less poisonous stomachic and contact insecticides are kerosene emulsion, slug shot, etc.

Common Arsenical Sprays for Chewing Insects.

Paris Green is still a satisfactory insecticide if its foliage-burning qualities are overcome with the addition of a small amount of lime. Arsenate of lead is a more satisfactory material, which seems to meet most of the requirements for an arsenical poison that will not injure foliage, has good adhesive qualities and, if in the powdered form, will not deteriorate by drying or freezing. The powdered arsenate of lead is therefore recommended over the paste form, which consists of 50 per cent of water and adds to the cost of transportation.

Arsenate of Lead. Arsenate of lead, although an arsenic compound, is a less powerful poison than Paris green and must therefore be used in larger quantities. It is lower, however, in price than Paris green. Arsenate of lead may be obtained in two forms, viz., a thick, white paste or a very fine powder. The powdered form, although not differing chemically from the paste, has advantages over the paste form since it is not injured by freezing or drying. The paste arsenate of lead is one-half water and for this reason twice as much of the paste as of the powder must be used in the usual spraying operations.

The powdered form is coming into general favor and use for dry applications by means of dusting apparatus. The rapidity and ease of application and the good results secured are tending toward a widespread use of this form of the poison.

Arsenate of lead has advantages over Paris green in adhesive quality, non-burning of foliage, and the white color by means of which thorough spraying is more easily determined. Arsenate of lead remains in suspension in water longer than Paris green, which settles to the bottom more quickly.

ARSENATE OF LEAD—PROPORTIONS FOR SPRAYING.

Arsenate of lead (powder)	1-3 lbs.
Water, Bordeaux mixture or lime-sulphur solution	50 gals.
or	
Arsenate of lead (paste)	3-6 lbs.
Water, Bordeaux mixture or lime-sulphur solution	50 gals.
In small quantities use,	
Arsenate of lead (powder)	1 tablespoonful
Water	1 gallon

Paris Green. This well-known spray material is an arsenical compound which when pure is a brilliant green, finely divided powder.

It may be applied in a liquid spray or may be used with ten or twelve times its weight of plaster Paris, flour, or fine air-slaked lime which is preferable.

Burning of the foliage when spraying with Paris green will occur on account of a small amount of water soluble arsenic. This difficulty may be overcome by using an equal amount of lime which counteracts the burning qualities. Paris green has only one advantage over arsenate of lead on account of its more violent poison and its quicker action on insects.

The use of Paris green for spraying is advantageous in case the poison needs to be removed where plants are used for show purposes. The same is true in its use on certain fruits which are approaching the ripening stage.

PARIS GREEN—PROPORTIONS FOR SPRAYING.

Paris green	5-8 oz.
Lump lime	1 lb.
Water or Bordeaux mixture (never lime-sulphur)	50 gals.
In small quantities use,	
Paris green	1 teaspoonful
Lump lime	Size of a walnut
Water	2 gals.

Hellebore. This vegetable poison, which is manufactured by finely grinding the roots of the white hellebore plant, has been used quite generally on trees and shrubs bearing fruits which are nearly ripened and almost ready for picking. Hellebore quickly loses its poisonous properties on exposure to the air and sun; and it will lose its strength rapidly unless it is kept in air-tight containers.

Poison Bran Mash. A mixture of Paris green, bran, syrup

and water is a satisfactory control for cutworms, including the species generally called the "army worm". Cutworms generally hide under debris or rubbish or in the ground during the day, and come out to feed at night. A single broadcast application in the late evening of poison bran mash is generally sufficient for effective control of these troublesome pests.

POISON BRAN MASH—FORMULA FOR PREPARATION.

Ingredients—	Large Quantity	Small Quantity
Bran	20-25 lbs.	1 qt.
Paris green	1-2 lb.	1 teaspoonful
Common molasses	1 qt.	1 tablespoonful

Water—just enough to thoroughly moisten.

Common Contact Sprays (for Sucking Insects).

As previously stated, insects which derive their nourishment from the juices of plants through a tiny sucking beak, can be controlled most satisfactorily by the use of the so-called contact sprays. Certain materials which are corrosive or oily in nature kill the insects by contact with the body. In spraying for this group of insects it is necessary that the spray material hit every insect to be killed, and for this reason more thorough application of the spray material must be made.

Lime-Sulphur Solution. A boiled chemical mixture of lime and sulphur, containing many peculiar compounds of these two materials, has been for several years a standard spray for the control of certain species of scale insects and plant lice, particularly in the dormant season.

In addition to its value as an insecticide, lime-sulphur, particularly in strong solution, is an efficient fungicide, aiding greatly in the control of scab, mildew and certain other fungous diseases. It can be readily used in conjunction with arsenate of lead as a combined spray.

Kerosene Emulsion. This very generally used contact insecticide can be readily prepared at home. The stock solution should be made up with care by following directions carefully, after which it must be diluted to the proper proportions for spraying.

KEROSENE EMULSION.

(Stock Solution—66% Oil.)

Kerosene (coal oil)	2 gals.
Soft or rain water	1 gal.
Hard soap	½ lb.
In small quantities use—	
Kerosene	1 pt.
Soft water	½ pt.
Ivory Soap	⅛ cake

Dissolve the soap and add the kerosene and shake violently in a quart Mason jar. Dilute as directed below.

DILUTIONS FOR KEROSENE EMULSION.

For 15% spray add 1 part stock solution to	3½ parts of water
For 12% spray add 1 part stock solution to	4½ parts of water
For 10% spray add 1 part stock solution to	5½ parts of water
For 8% spray add 1 part stock solution to	7¼ parts of water
For 6% spray add 1 part stock solution to	10 parts of water

For dormant spraying 12-15 per cent kerosene emulsion can be safely and satisfactorily used, but for spraying of foliage in summer never use stronger than 10 per cent, 6 or 8 per cent emulsion being the more advisable percentage for general spraying of trees and shrubs.

Nicotine or Tobacco Sprays. The most satisfactory and safest spray material for killing plant lice (aphis), thrips and other soft-bodied insects is a nicotine preparation. These preparations are put on the market commercially, and, although apparently expensive in their concentrated form, when diluted according to directions a very effective spray is obtained at a cost little exceeding one cent a gallon.

"Black-Leaf 40" is a 40 per cent nicotine-sulphate combination which is very widely used in spraying operations. Other nicotine preparations of similar or lesser strength are on the market. A 40 per cent nicotine-sulphate solution used at the rate of one part to 1,000 parts of water, with or without soap, is very effective against all forms of the more delicate aphids and tender insects.

For the black cherry aphis and the black peach aphis it is necessary to use a stronger solution, one part to 600-800 parts of water being recommended.

Tobacco Decoctions can be prepared readily at home by steeping (not boiling) one pound of tobacco stems in three gallons of water in a covered vessel for two or three hours. Strain off the liquid and use as a spray. If very delicate plants, such as new growth on rose bushes or sweet peas, are to be sprayed, this solution can be diluted with equal parts of water.

Nicotine or tobacco preparations, although very effective for their designated purposes, do not injure foliage and on that account are very desirable sprays.

Miscible Oils. Certain commercial preparations known as miscible oils which are really in emulsion form and will readily mix with water are now on the market. These are used very successfully in large spraying operations and are particularly successful in dormant spraying for the control of scale insects.

A Common Fungicide.

Bordeaux Mixture. On account of the fact that it is often desirable to combine insecticides with fungicides in spraying, the formula for the preparation of Bordeaux mixture is included. It should be remembered that this material is in no way fatal to insects, but, on the contrary, is an effective control for various types of fungous diseases.

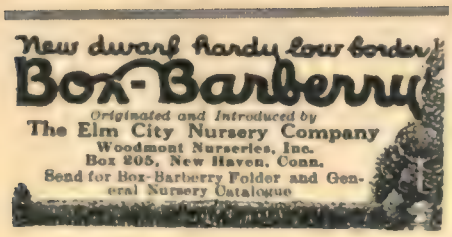
BORDEAUX MIXTURE.

Copper Sulphate, Blue Stone or Blue Vitriol	3 ounces
Lump Lime or Hydrated Lime	3 ounces
Water	2½ gallons

To make Bordeaux mixture, procure the ingredients at a drug or seed store. If lump lime is used, it must be fresh. Instead of lump lime, some authorities prefer fresh hydrated lime as being just as good and at the same time much simpler to use, needing only to be stirred into the water. Hydrated lime is lime to which enough water to dry-slake it has been added by the manufacturer. It is a powder and does not require slaking.

For making or holding Bordeaux mixture, use containers of wood, glass or earthenware. In one container dissolve the copper sulphate in about one-half gallon of hot water and then dilute with enough cold water to make a total of 1¼ gallons; or wrap the copper sulphate in a small piece of cheese-cloth, fill a quart jar with cold water and suspend the copper sulphate into the top of the water; in a couple of hours it will be dissolved. In another vessel slake the lime and dilute with enough water to make 1¼ gallons. If hydrated lime is used, simply mix it with water. Then pour these two solutions together, pouring the solution of copper sulphate slowly into the mixture of lime and water, stirring vigorously while this process is under way. The stirring insures proper mixing of the two.

For home mixing the poisons and chemicals required for sprays and other remedies and preventives can be bought at a drug or seed store. The mixtures ready prepared can be bought at a seed store.



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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

IN the great movement for the rational use and the perpetuation of the forests of this continent, the foresters of the country must make themselves its leaders but they must have not only broad but restrained vision and must work in a spirit of co-operation with all the other interests concerned. There must be no thought of compulsion, no "mandatory" legislation, until everything else has been tried and has failed. Education is far better than legislation and the great effort must be toward an enlightened public opinion. This must be fostered by the profession and they must show their faith in their works and have the courage of their convictions. The whole question of proper utilization of our forests and their rational conservation, is of so eminently practical a nature, so appealing to every man of common sense and judgment, that there is no need for any sentimental "movement." Every man, whether he is a lumberman or a business man, will admit the necessity of preserving our forests for a sustained yield at once, it is only necessary to work out the ways and means so that the end can be accomplished with the least dislocation of existing conditions. This is the job of the foresters.

Mr. Henrik Carbonnier, Honorary Attache to the Swedish Consulate General in Montreal, has been making visits to lumbering operations in Eastern Canada and is now on his way west to look over conditions in British Columbia. He will then go down the west coast, then to New Orleans and the Southern pine operations, returning to Eastern Canada in May. Mr. Carbonnier notes that conditions in Eastern Canada are more favorable for natural reproduction than in Sweden, due he thinks to the greater precipitation. He was astounded at the wastefulness of the methods of cutting and the lack of care for the future stand. Also at the small number of foresters in charge of woods operations, practically none. He admitted that our problem of natural regeneration was complicated by the number of hardwood species and their thriftiness.

There was practically a complete failure of the Norway spruce seed crop this year in Sweden and Norway, and the seed will be very scarce and difficult to procure next summer.

Mr. Piche, Chief Forester of Quebec, has completed a new set of cutting regulations to govern lumbering operations on Crown lands and these will probably be put into force the coming summer.

The assistant forester of the Abitibi Pulp and Paper Company has completed an exploration trip to James Bay and reports that an enormous area of country has been burnt over and that there is nothing like the amount of timber which many people had supposed. This trip took nearly four months and many difficulties and hardships were surmounted.

Mr. L. S. Webb, of the University of New Brunswick, has been appointed Forester for the Province of Nova Scotia. This appointment is due to the Hon. Mr. Daniels, Attorney General of that Province, who has always taken a great interest in the proper handling of its forests.

Mr. H. R. MacMillan, late trade commissioner for British Columbia and one-time chief forester, is leaving for a trip to Australia on behalf of the company which he has recently formed.

Professor McCarty, of Syracuse University, will spend the summer on investigative work for the Dominion Commission of Conservation. His work will probably be in Ontario.

A very interesting conference on wild life was held recently under the auspices of the Commission of Conservation in Montreal and problems of game protection, fur farming and kindred subjects were discussed by experts. The remarkable advances in the price of furs bring the danger of the commercial extinction of certain species and this must be guarded against, but at the same time everything must be done to increase the number of furbearing animals. The convention decided unanimously to establish a national registration of silver foxes and took the necessary steps toward initiating this important work.

The forest revenues from New Brunswick have more than doubled during the past year. The total estimated will be $1,500,000. This is nearly three times that of 1917 and closely approximates that of Quebec. This is the result of putting technical men in charge of the work, especially the scaling, eliminating patronage and giving the forest personnel all the year round work.

An interesting report has been received from Ontario. A company operating its own camps, put in iron bunks, a shower bath and cleaned up things generally, im-

WHEN MEMORIAL TREES ARE PLANTED PLEASE INFORM THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.

proving the conditions. They are paying ten dollars per month less than neighboring camps and are getting the best men.

young man who has just been in the Quebec woods as an assistant scaler says that if a phonograph and some records were put into each logging camp the men would appreciate it greatly. Recreation for log gers has never been considered in making plans for operations and there can be no shadow of doubt but that better living conditions and a certain amount of recreation and decent treatment would have the same effect in a logging camp as in a mill. Lumberjacks are just as human as any one else.

The Laurentide Company, Ltd., has completed a two months' ground study of aerial photographs. Detailed studies were made of individual trees, their height, crown spread and condition with the object of ascertaining just what trees represented in the pictures really were. Stands per acre were also investigated carefully. Some very interesting results were obtained and will be studied and reported on in detail later. Photographs taken of lands which were to be purchased for reforestation have proved of the utmost value. The areas of cleared land, of brush, of timber and of swamp show up clearly and are easily measured with the planimeter. These are indexed in a loose leaf binder, each farm being shown in a photograph with a sheet opposite showing the area in each kind of land, the unit price which will be paid for each kind and the total price to be offered. When a prospective seller comes in he is shown the photograph of his land and told how many acres he has of each class of land, he is told the unit price he will be paid and the total offered him. It is remarkable to see how farmers who have, many of them, never seen a map, will at once recognize a photograph of their land and will point out details which they recognize.

Very light tractors have been tried this winter in the St. Maurice Valley logging operations but have not proved satisfactory for the following reasons: Unintelligent operation, *i. e.*, trying to operate beyond capacity and on too narrow roads, lack of skilled handling in running and repairing, wrong kind of tracks for operating in snow. The probability is that the best results will not be obtained with tractors weighing less than eight to ten thousand pounds with special snow tracks. The manufacturers are seriously at fault inturning out machines made of poor materials and poorly designed and in not sending competent engineers into the woods to observe conditions of operation. The field is a large one and is well worthy of cultivation for the use of some machine to replace horses is bound to come. The manufacturers are the people who should do the experimenting and they should not expect the lumber industry to take poorly built machines and waste money in trying them out.



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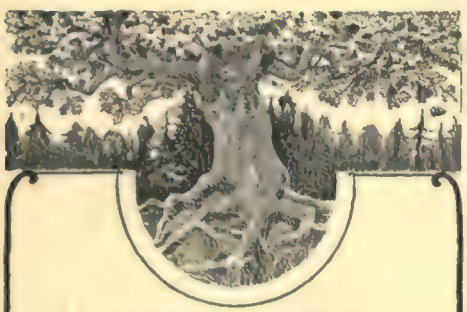
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STATE NEWS

IDAHO

J. G. MILLER, the dean of the School of Forestry, University of Idaho, in his report to the State Land Board regarding the recreational features of the State's lands near Payette Lake, makes the following statement:

"The United States Forest Service has forseen the need of playground features and has modified the administration of National Forests to meet it. In consequence, the recreational use of these Forests has grown with incredible rapidity and they have in a very real sense now become national playgrounds."

NEW JERSEY

A SURVEY of the progress of Forestry in New Jersey, conducted by the State Forester during the past winter to determine the extent that woodland owners have actively engaged in forestry practice, has shown most gratifying results. Since the State of New Jersey owns less than one per cent of the forests within her borders, it has been the policy of the State Forester to support and encourage the interest of private owners in the practice of forestry, and in this way serve the public interest. Many owners who have taken advantage of this aid, have found forest planting and woodland management both practicable and profitable.

The replies received to questionnaires sent to all persons who have indicated an interest in forestry in the past, show that 114 active co-operators, including 11 municipalities and public institutions, have practiced intensive forestry methods, including fire protection, improvement cutting, close utilization of products, etc., on approximately 10,000 acres of woodland, while 40,000 acres more under the same ownership have been protected and improved to some extent, and definite plans have been made for more intensive management. The same cooperators, together with 41 others, who are at present inactive, are planning to extend forestry management to more than 12,000 acres of woodland that have received no attention up to this time.

Progress has also been made in forest planting. While natural reproduction is usually adequate and satisfactory in many parts of the State, it is often necessary to reestablish forest growth by planting on land unwisely cleared and unfit for agriculture, or where all reproduction has been destroyed by fire. More than 1,600 acres have been reproduced by persons co-operating with the State Forester, and nearly 300 acres more will be planted within a short time.

Believing that number of State Forests are valuable as a public demonstration of the methods and results of forestry practice, the State has acquired six State Forests with a total area of 16,591 acres of woodland, managed by the State Forester. Upon these lands, 50 acres of forest plantations have been made, for the purpose of experiment and demonstration.

Altogether there are 80,000 acres within the State, approximately 4 per cent of the State's total woodland area, upon which forestry practice is now established or definitely planned for in the immediate future. The owners have been won over to the realization of the importance and practicability of forestry methods and are pledged to its practice.

The progress indicated in this survey is encouraging when it is realized that this work was commenced less than 15 years ago, but the accomplishment seems insignificant when we consider what yet remains to be done. New Jersey has nearly 2,000,000 acres of woodland, most of which is in a run-down condition, because of repeated forest fires, wasteful logging, neglect of owners and abuse by the public. Nearly three-quarters of this area is unfit for any profitable use other than growing timber. New Jersey's problem is to return this vast area of semi-waste land to productiveness, and this can be done only by preventing and controlling forest fires and by applying practicable forestry management to the woodlands. When protection and management become established, the value of New Jersey's woodlands will be increased from less than $6,000,000 to over $200,000,000. Instead of furnishing less than one-tenth of the lumber used within the State, as at present, New Jersey's woodlands are capable of supplying a very great portion of the lumber and wood consumed within her borders. It is needless to point out the benefit to land owners, producers and consumers that will result.

NEW MEXICO

FOREST fire prevention held an equal part with tree planting in the observance of arbor day in New Mexico on April 9, according to the arbor day proclamation issued by Governor O. A. Larrazolo. In setting forth the need of tree-planting, he pointed out the equal need of protecting forests from fires, and urged also the planting of memorial trees and groves in memory of New Mexico soldiers who gave their lives in the war. In urging the planting of trees on arbor day, Governor Larrazolo asked school teachers, forest rangers, and all others having knowledge

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I need a copy of **Forestry and Irrigation** for March, 1904. Will anyone who can furnish a copy please write me promptly? I should also like to hear from anyone who can supply copies of **The Forester**, bound or unbound, before December, 1900. I have quite a number of duplicates of **Forestry and Irrigation, Conservation** and **American Forestry**, the oldest being December, 1902, and should like to get in touch with anyone wishing to complete their files.
GORDON PARKER, Colorado Springs, Colo.

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of the prevention of forest fires to give talks before school children and public audiences on the necessity of care with fire in the woods. As a result of the Governor's proclamations, the forest service took a part in the campaign to have forest fire prevention taught in all the public schools on arbor day. Many forest rangers gave talks to school children, both on tree planting and on fire prevention.

NEW YORK

HIGHER prices than have ever before been known for forest products, with a shortage of raw material, and the disappearance from the State of many of its wood-using industries are shown by the wood-using survey of New York State being brought to a close by The New York State College of Forestry at Syracuse and the United States Forest Service, working in co-operation. The preliminary work has been completed and two men have been sent into the field to clear up the last details of the survey. Raymond J. Hoyle is representing the State College of Forestry in the field work, while R. V. Reynolds of Washington is the federal representative in the State. The results of this survey will be compiled and published, in such form as to keep individual reports confidential, but it can be said even now that the report will show a dangerous loss to the State of its wood-using industries. The wood utilization service, handled by Prof. E. F. McCarthy, who is also in charge of the wood-using survey for the College, corroborates the showing of the industries survey, in that it indicates a great demand for lumber products in the State, with a great shortage of material. A single offering of lumber through this co-operative marketing service brought 27 replies, and shows conclusively that the farmers woodlot today is in a position to prove its worth, and to become a definite income producer with proper handling, both as to growing timber and to proper marketing of the tree ready for felling.

NORTH CAROLINA

J. S. Holmes, State Forester of North Carolina, in distributing an article entitled "Our Future Hardwood Supply," says:

"We in North Carolina have at least come to the point where the lumbermen, the lumber users, and the general public are pretty much agreed that something must be done if our forest industries are to be carried on longer than the next ten or fifteen years. A recent questionnaire filled out by a large number of the furniture and other wood-using industries of the State emphasizes the point that our own supply of timber is becoming exhausted. In other States, the same thing is happening, so that the only sensible thing to do is to look the issue squarely in the face and plan to raise our own timber in our own region.

PENNSYLVANIA

GOVERNOR Sproul of Pennsylvania, recently made an appeal by personal letter to 2,600 representatives of corporations and organizations to aid in the restoration of Pennsylvania's forests by the prevention of forest fires. The governor's appeal is a part of the fire prevention campaign which Chief Forester Gifford Pinchot has started to check the annual damage done to State forests by spring fires.

Chief Forester Pinchot refers to the "desert" created b forest fires equal in area to one-sixth of the total area of the State and shows that "the State has appropriated for forest fire protection during the last six years less than $30,000 per year, or not a quarter of a cent per acre, in an effective effort to stop this gigantic loss." He compares this "like trying to put out a burning building with water in a spoon."

"If our forest lands," say the Pinchot statement, "had been wisely handled, they would be growing each year as much timber as they produced in the year of their greatest yield, and that timber would be available at half the present prices. And the difference is only part of what we pay for our forest devastation. We pay at least $25,000,000 a year for freight on lumber brought into the State which might have grown at home. We pay at least $50,000,000 more for the lumber itself. Then there is the loss from the closing or removal of the wood-working industries, the loss from floods, the loss to farmers and the business men, the loss of fish and game and many other losses.

"There is small comfort for us beyond our own boundaries. As a nation, we cut 2½ times as much as we grow. Our needs are increasing. Our domestic supplies are dwindling, and there are no forests in the world from which we can import lumber enough of suitable kinds at suitable prices to meet our needs. Under these conditions a national timber shortage was inevitable. As the prices of paper and lumber show, it is here already and is growing steadily worse.

"For all these reasons it would be sound business and wise foresight for us to protect from fire, restore to production and as it were, annex once more to the State the wasted forest lands of our commonwealth. These lands might be and should be pouring out a flood of valuable products, saving us from a vast and needless expense and securing us against the certainty of suffering from the national timber famine which is now clearly in sight. Fire stand in the way."

AIR PILOTS TO SPOT FOREST FIRES

ALBUQUERQUE, New Mexico, U. S. Army aviators while patrolling their aerial beats along the Mexican border will take time to locate forest fires on the Coronado National Forest, in southern Arizona, under an agreement made by Major Ralph Royce, of the air service, and District Forester Frank C. W. Pooler of the Forest Service. Under this agreement, army aviators will be permitted to leave their border patrol in order to ascertain the exact location of forest fires, and in certain cases special patrol trips may be undertaken with the permission of the district commander of the air service. The region covered by this patrol includes the Chiricahua, Tumcacori, and Huachuca mountain ranges. When forest fires are discovered by the airmen, notice will be telegraphed to the nearest forest ranger.

The agreement between the air service and the Forest Service marks the beginning of aerial forest fire patrol in the southwestern National Forests, and forest officials express themselves as highly gratified with the enthusiastic cooperation of the army. Extensive air patrol work is already being done in California and the Pacific northwest through the cooperation of the army and the forest service.

Although aeriel fire patrol is still in the experimental stage, foresters are optimistic as to its future development and usefulness and many air service officers regard it as an excellent means of training army flyers, by giving them a practical objective in their work.

$10,000 FOR FOREST RESEARCH

THE National Research Council has received a gift from the Southern Pine Association of $10,000 to pay for the incidental expenses of a co-ordinated scientific study by a number of investigators of the regrowth of trees on cut-over forest lands with the aim of determining the best forestry methods for obtaining the highest productivity. Although some of these cut-over lands can perhaps be most advantageously used for agricultural purposes, there is a large acreage of them which will yield better returns if devoted to reforestation. Despite the large amount of forest study that is being conducted under government and State auspices, there is much need for additional investigation. This is well recognized by lumbermen and is especially indicated by the action of the recent meeting of the Southern Forestry Congress at New Orleans in formally endorsing the scientific projects of the National Research Council in regard to forestry. The gift from the Southern Pine Association is made as a result of this action. The investigation will be conducted under the advice of the Research Council's special committee on forestry, and will not duplicate any present government or other undertakings along similar lines.



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LUMBER COMPANY TO REFOREST

AT the annual meeting of the directors of the Great Southern Lumber Company at Bogalusa, Louisiana, the matter of a reforestation policy was brought to a head by General Manager Sullivan, who has long had it in mind. President A. C. Goodyear, like Mr. Sullivan, believes in the future of the paper industry at Bogalusa, and realizing that an end will come in time to the stock of virgin timber which now furnishes raw material to both the paper and sawmill, believes it good business for the company to provide raw material for the future; also, he thinks that the present is none too early to begin with it. This policy, in fact, was settled on at the meeting.

Mr. Sullivan secured the attendance of Austin Cary, logging engineer in the U. S. Forest Service, who about a year ago, in company with a member of the Bureau of Soils at Washington, made a rapid survey of conditions on the company's lands. A half day's trip in the field which the company's officials took in company with Mr. Cary was very convincing. It was very clear that with good management a heavy crop of pulpwood could be raised on certain types of cut-over land of no value for agricultural purposes in twenty years' time. Acre production, in fact, is probably three times as great as in the spruce region of the Northeast and of Canada, where, due to greatly shrunken supplies of pulpwood, tree planting on a considerable scale is already being carried on.

Fire control, the first step necessary in the new program, is already on foot in Washington and St. Tammary parishes, the company's field men having been taken into the organization for that purpose, managed by the State Conservation Commission. The next step contemplated is to select a man to take the lead in the work.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.35
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	2.50
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	1.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.35
LUMBER AND ITS USES—R. S. Kellogg	2.15
THE CARE OF TREES IN LAWN, STREET AND PARK—B. E. Fernow	2.17
NORTH AMERICAN TREES—N. L. Britton	7.30
KEY TO THE TREES—Collins and Preston	1.50
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record	1.75
PLANE SURVEYING—John C. Tracy	3.00
FOREST MENSURATION—Henry Solon Graves	4.00
FOREST PRODUCTS—By Nelson Courtlandt Brown	3.85
THE ECONOMICS OF FORESTRY—B. E. Fernow	1.61
FIRST BOOK OF FORESTRY—Filibert Roth	1.10
PRACTICAL FORESTRY—A. S. Fuller	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel B. Green	2.00
TREES IN WINTER—A. S. Blakeslee and C. D. Jarvis	2.00
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume	7.50
HANDBOOK OF THE TREES OF THE NORTHERN U. S. AND CANADA, EAST OF THE ROCKY MOUNTAINS—Romeyn B. Hough	3.00
GETTING ACQUAINTED WITH THE TREES—J. Horace McFarland	1.75
HANDBOOK OF TIMBER PRESERVATION—Samuel M. Rowe	5.00
THE HISTORIC TREES OF MASSACHUSETTS—J. R. Simmons	3.85
TREES OF NEW ENGLAND—L. L. Dame and Henry Brooks	1.50
TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst	1.50
TREES—H. Marshall Ward	1.50
OUR NATIONAL PARKS—John Muir	1.91
PRACTICAL FORESTRY—John Gifford	2.50
LOGGING—Ralph C. Bryant	4.00
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott	2.50
FORESTRY IN NEW ENGLAND—Ralph C. Hawley and Austin F. Hawes	3.50
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves	2.00
SHADE TREES IN TOWNS AND CITIES—William Solotaroff	3.00
THE TREE GUIDE—By Julia Ellen Rogers	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary	2.12
FARM FORESTRY—Alfred Akerman	.57
THE THEORY AND PRACTICE OF WORKING PLANS (in forest organization)—A. B. Recknagel	2.10
ELEMENTS OF FORESTRY—F. F. Moon and N. C. Brown	2.50
MECHANICAL PROPERTIES OF WOOD—Samuel J. Record	1.75
STUDIES OF TREES—J. J. Levison	1.75
TREE PRUNING—A. Des Cars	.65
THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss	3.00
SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY—By James W. Toumey	3.50
FUTURE OF FOREST TREES—By Dr. Harold Unwin	2.25
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FIELD BOOK OF WILD BIRDS AND THEIR MUSIC—By F. Schuyler Mathews	2.00
FIELD BOOK OF AMERICAN WILD FLOWERS—By F. Schuyler Mathews	2.00
FARM FORESTRY—By John Arden Ferguson	1.50
THE BOOK OF FORESTRY—By Frederick F. Moon	2.10
OUR FIELD AND FOREST TREES—By Maud Going	1.50
HANDBOOK FOR RANGERS AND WOODSMEN—By Jay L. B. Taylor	2.50
THE LAND WE LIVE IN—By Overton Price	1.70
WOOD AND FOREST—By William Noyes	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.	2.50
MANUAL OF POISONOUS PLANTS—By L. H. Pammel	5.25
WOOD AND OTHER ORGANIC STRUCTURAL MATERIALS—Chas. H. Snow	5.00
EXERCISES IN FOREST MENSURATION—Winkenwerder and Clark	1.50
OUR NATIONAL FORESTS—H. D. Boerker	2.50
MANUAL OF TREE DISEASES—Howard Rankin	2.50
THE BOOK OF THE NATIONAL PARKS—By Robert Sterling Yard	3.10
THE STORY OF THE FOREST—By J. Gordon Dorrance	.65
FOREST MANAGEMENT—By A. B. Recknagel and John Bentley, Jr.	2.60
THE FOREST RANGER AND OTHER VERSE—By John Guthrie	1.60
TIMBER, ITS STRENGTH, SEASONING AND GRADING—By H. S. Betts	3.10
THE HISTORIC TREES OF MASSACHUSETTS—By J. R. Simmons	3.65
TIMBERS—AND THEIR USES—By Wrenn Winn	5.15
THE KILN DRYING OF LUMBER—By Harry D. Tiemann	4.65

*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

THE GUIDE TO NATURE

EDWARD F. BIGELOW, Managing Editor

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BOOK REVIEWS

TIMBERS—and Their Uses, by Wrenn Winn. E. P. Dutton & Company, New York. Price, $5.00 net. This is a handbook for woodworkers, merchants, and all interested in the conversion and use of timber. Thirteen years ago Roosevelt called wood an "indisputable part of the material structure upon which civilization rests" and in this comprehensive work the author includes a list of all known woods useful for any purpose; their geographical distribution; a survey of the world's resources; parasites and insect pests of timber and the formation of wood and how to season and test timber. The book is illustrated by a series of ninety-six new photographs showing the grains of woods.

"Many, Many Moons," by Lew Sarett. Henry Holt and Comany, New York, Price $1.50.

For ten years Lew Sarett worked in the North Country among the Indians as a guide and woodsman. Out of the tall timber of the land of K'cheemagee, he comes with this book, "Many, Many Moons." In it he has captured the spirit of the wilderness and of its Indians. He divides his book into three parts. The author, known among the Indians as Payshig-ar-deek, or "Lone Caribou," devoted Part 1 to the medicine chants, the primitive love songs and dances of the Red Man, a peculiar contradictory type combining droll humor, tragedy, and beautiful spirituality; one moment a bizarre character stamping and grunting, bedecked in the finery of eagle feathers and a battered derby, and the next a "child of nature," who knows her every mood and who sings and talks to her in the language of winds and waterfalls. In these poems are new melodies, the weird tunes of the medicine rattle and the tomtom, and the woodnotes of the Indian flute. Part II is a lyric interlude devoted to the wood sounds, and scenes which the Indian knows, rather than to the Indian himself. In it the wolf, the white-throat, and the loon utter their nightcries. Part III contains a group of humorous and tragic council talks, unusual dramatic monologues. The book concludes with a tragic note as the Red Man, in a vivid allegory, drowns beneath wave after wave of white men.

Opie Read says of Sarett: "Poetry is older than Egypt and younger than Oklahoma; it is man's eternity of sentiment. They tell us that there is to come the poet of business, of science, of the worry called progress, but there is but one poet, the never-dying poet of nature. Among the poets arising, none gives more of graceful and healthful promise than Lew Sarett. He is true because he is of the woods, his muse a perfumed breeze, sweetly murmuring. The gathering storm of nature throbs in his verse."

A LUMBERMAN'S VIEWPOINT

MR. P. D. Camp, president of the Camp Manufacturing Company, of Franklin, Virginia, became a member of the American Forestry Association recently, and in accepting membership, Mr. Camp, who is a practical lumberman, whote about forestry from a lumberman's standpoint. He said:

"We are in receipt of your letter and note you start by saying, 'We need your help to perpetuate our forests.'

"Well, I think the lumbermen, and not only the lumbermen, but every American citizen needs your help and needs co-operation from the Government. I note with great interest the amount of virgin timber in the United States today, and how fast it is being cut out. It is alarming to think how rapidly we are cutting out our timber and doing nothing to try to conserve our timber. There are a good many things we could do to conserve our forests that we do not, and especially along the Atlantic Coast.

"One great trouble with us is, our States are taxing the lumbermen to such an extent that it is causing the lumbermen to cut the timber as fast as they can because they cannot afford to pay the enormous tax that is put on them, and especially in North Carolina at the present time. As you know, if a man has property and it is not yielding him a fair compensation, he tries to turn it into other property that will yield a fair compensation. Take today with the enormous tax they are putting on timber in North Carolina, a man is better off to put his money in United States bonds than put it in timber. If we had some law to put a minimum tax on cut-over land or timber lands, then there would be an inducement to owners of the land or timber to hold same instead of cutting it off."

WOOD IDENTIFICATION.

A SECTION of a telephone pole, about eight inches high and the same in diameter, sent unwrapped by parcels post from Hawaii, is one of the curiosities of the Wood Identification Department of the Forest Products Laboratory at Madison, Wisconsin. The poles of this wood had given such remarkable service that the sample was sent to Madison for identification, the records having been lost which would identify them during the years in which they had been in service. It was immediately recognized at Madison as of Port Orford Cedar, which, of course, came originally from our Northwest.

In connection with the identification of many hundreds of pieces of woods, some of them small splinters, the Forest Products Laboratory has failed only three or four times in its exact determination of the species and these failures have been in foreign and rare woods. Some species may be identified at once by a casual examination, but where several varieties are very similar in appearance, a microscopic examination of cell structure is necessary. This is the only way by which some woods may be positively identified. Samples from woods of every section of the globe fill huge file cases at the Laboratory, some of them being of exceeding beauty and interest. A small block of lignum vitae from South America, the heaviest wood in the world, feeling in the hand more like iron than wood, is contrasted with a block of similar size of the lightest wood in the world, corkwood.

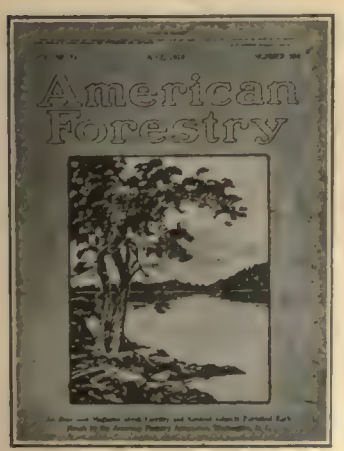
IMPROVING WOODLANDS BY CUTTING

LACK of proper thinning and cutting is a common cause of woodlands being unprofitable, according to a recent bulletin entitled, "Making Woodlands Profitable in the Southern States," issued by the United States Department of Agriculture. Nature usually overcrowds trees in a given space, says this publication, and so steps should be taken to give them sufficient light and soil moisture to thrive and become profitable. By properly controlling the number of trees on a tract it is possible to increase their rate of growth and eventually their size. Except for the production of cordwood, a few large trees on a given area are usually more desirable than many small ones. If possible, valuable kinds of wood should be grown in preference to common woods which bring lower prices. Woodlands in this country, as a rule, contain many crooked, forked, and diseased trees which should be replaced by straight, sound ones. Soon after a cutting trees show an increased growth and the whole woodland rapidly increases in value by the elimination of inferior trees.

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SALE OF TIMBER
QUINAIELT INDIAN RESERVATION
MOCLIPS UNIT

SEALED bids in duplicate, marked outside "Bid, Moclips Unit," and addressed to the Superintendent, Taholah Indian School, Taholah, Washington, will be received until twelve o'clock noon, Pacific time, Tuesday, June 1, 1920, for the purchase of timber on the tract in Townships 20 and 21 north, Ranges 11 and 12 west, Williamette Meridian, in Quinaielt Indian Reservation. The said unit includes about 3,560 acres, with a total stand of about 125,000,000 feet, of which about 70,000,000 lies in about 1880 acres of allotted land, as to which separate approved contracts with the Indian owners may probably be made. The sale embraces approximately 70,000,000 feet of cedar, 19,000,000 feet of Douglas fir, 14,000,000 feet of spruce, 20,000,000 feet of hemlock, 1,000,000 feet of white pine, 575,000 linear feet of cedar poles, and an unestimated amount of Douglas fir piles. Each bid must state the price per thousand feet Scribner decimal C log scale, that will be paid for timber cut and scaled prior to April 1, 1924. No bid will be considered for the first period of less than the following rates per thousand feet: Three dollars fifty cents ($3.50) for live and dead cedar; three dollars ($3.00) for live and dead Douglas fir and spruce; two dollars ($2.00) for white pine; eighty cents ($.80)) for hemlock, white fir and other species; per linear foot for cedar poles 45 feet and over in length with not greater than a nine-inch top diameter, one and three-fourths cents (.0175); for cedar poles 45 feet and under in length, one and one-fourth cents (.0125); for cedar poles 20 feet and under in length with not greater than a six-inch top diameter, three-fourths cent (.0075); and for Douglas fir piles, with not greater than a sixteenth inch butt diameter, one cent (.01) per linear foot. Each bid must be accompanied by a certified check of $10,000. The deposit will be returned if the bid is rejected, but retained as liquidated damages if the required contract and bond are not executed and presented for approval within sixty days from the acceptance of a bid. The right to reject any and all bids is reserved. Copies of the bid and contract forms and other information may be obtained from the Superintendent, Indian School, Taholah, Washington. Prices subsequent to April 1, 1924, will be fixed by the Commissioner of Indian Affairs by three-year periods.

Washington, D. C., March 17, 1920. CATO SELLS, Commissioner of Indian Affairs.

SALE OF TIMBER
KLAMATH INDIAN RESERVATION
SOLOMON BUTTE UNIT

SEALED bids in duplicate, marked outside "Bid Solomon Butte Unit" and addressed to the Superintendent, Klamath Indian School, Klamath Agency, Oregon, will be received until twelve o'clock noon, Tuesday, June 15, 1920, for the purchase of the merchantable timber on the tract in Townships 32 and 33 South, Range 8 East, Williamette Meridian, Klamath Indian Reservation. The said unit includes about 11,700 acres, with a total stand of approximately 95 million feet of timber, principally Western Yellow Pine, of which about 5 million feet of timber is on about 700 acres of allotted land, as to which separate approved contracts with the Indian owners may probably be made. Each bid shall state the price that will be paid per M for Yellow Pine, Sugar Pine, and Incense Cedar, and for other kinds of timber that will be cut and scaled prior to April 1, 1924. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs for three-year periods. No bid will be accepted for less than $4.00 for Yellow Pine, Sugar Pine and Incense Cedar, and $1.50 for other species during the period ending March 31, 1924. Each bid must be accompanied by a certified check on a solvent national bank, drawn in favor of the Superintendent of the Klamath Indian School, to the amount of $10,000. The deposit will be returned to unsuccessful bidders, but retained as liquidated damages if the successful bidder shall not execute contract and furnish satisfactory bond for $30,000 within sixty days from the acceptance of his bid. The right is reserved to waive technical defects and to reject any or all bids. For copies of contract and regulations, fuller description of the sale area, and other information apply to the Superintendent of the Klamath Indian School, Klamath Agency, Oregon.

Washington, D. C., April 5, 1920.

CATO SELLS,
Commissioner of Indian Affairs.

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

THE total enrollment in eight forestry courses given during the current semester is 243, the courses being as follows: General Forestry, Protection, Mensuration, Logging, Forest Improvements, Forest Finance and Organization, Forest Administration and Policy, Upper Division Conference.

The Forestry Club has held four interesting meetings since last writing. District Forester P. G. Reddington was the guest of honor and gave a very interesting talk on "Some Difficulties and Hardships Met With in Forest Service Field Work." Ansel Hall, '16, of the National Park Service and at present on leave of absence to assist in giving the course in General Forestry, gave a talk on the beauties of the high Sierras in and adjacent to Sequoia National Park. A remarkably fine set of lantern slides added greatly to the enjoyment of the evening. Prof. Bailie of the forest school at Nanking University, gave a most interesting discussion of land tenure and colonization work in China. In his work for the poorer elements in China, Professor Bailie has had some strenuous experiences and almost lost his life while working on his last project. Earl M. Blair gave his report as delegate to the convention of the Intercollegiate Association of Forestry Clubs held recently at New Haven. He reported interesting meetings, royal welcome from the Yale club members, and a fascinating trip through the Canadian Rockies on his way home. It is with considerable pride that the California club, as the youngest member of the association, accepts the honor of being the president club for the coming year. Tom Oliver and Virgil Davis have been elected president and secretary of the I. A. F. C., and we all look forward to meeting a large delegation from other clubs here at Berkeley next year.

Members of the Forestry Club joined forces with the Agricultural Club in doing a day of improvement work on the grounds adjacent to the Agricultural group of buildings. Classes were suspended on two half days and students and faculty got busy with picks, shovels and wheelbarrows. Many trees were planted, including Deodar Cedars, Lebanon Cedars, Cryptomeria Elegans, Colorado Blue Spruce and Chinese Juniper. A large number of ornamental shrubs were set between the trees and the work has added materially to the attractiveness of the grounds.

Prof. D. T. Mason, at present on leave of absence from the University and engaged on income tax matters in Washington, will give the commencement address at the Yale Forest School graduating exercises next June.

Prof. Woodbridge Metcalf has recently returned from a trip to Eucalyptus plantations in the Angelus National Forest in company with Forest Examiner E. N. Munns. The erosive effects of even the slight rains of the present season on the large area burned over last summer were noted at several points. A heavy rainfall this winter on this area of 100,000 acres would have caused enormous damage.

The supervisor's meeting of District 5 was notable for the definitely expressed need for more technically trained foresters in California. Members of the Faculty were invited to the meetings and greatly enjoyed this opportunity of meeting many of the Forest Service field men.

Charter Day, March 23, the 52nd birthday anniversary of the University of California was marked this year by the formal inauguration of David P. Barrows as president. The exercises in the Greek Theatre were very colorful and a large number of Universities were represented by official delegates.

IDAHO SCHOOL OF FORESTRY

THE coming of the spring recess marked the termination of the work of the students in the Forest Ranger Course at the University of Idaho. The School of Foresry offered this year, in addition to the Ranger Course of five months, a short course of three months, aiming to experiment in the relative desirability of the two plans for ranger course students. The registration, although not heavy, was of unusually fine quality, and the work proved so attractive that two of those who came only for the Ranger Course registered for the regular university course in forestry. The plan of offering a Ranger Course of five months instead of three, as followed by several other institutions, has proven so successful that it will be adopted for the future.

NEW YORK STATE COLLEGE OF FORESTRY

THE New York State College of Forestry has for the second time in two years been awarded one of the American-Scandinavian Foundation Fellowships, entitling the winner to spend a year, expenses paid, in Sweden and Norway. Perry H. Merrill, of the closs of 1917, has been awarded this fellowship, and has resigned as assistant State Forester of Vermont to accept. He leaves about the first of July.

BOUQUETS

"You are to be congratulated on keeping the magazine up to the high level of excellence it has always maintained under your direction."

PROF. JOHN BENTLEY, JR.

"AMERICAN FORESTRY should be supported by everyone interested in perpetuating our forests. There is no more valuable purpose than the one of conservation of trees, and this great work should interest everyone connected with our public schools."

GEORGE W. FRICK,
Superintendent of Schools, Alameda County, California.

"I have derived a very great benefit from AMERICAN FORESTRY and I am in sympathy with your ideals and wish you every success."

C. ARTHUR BEACH.

"I read the AMERICAN FORESTRY magazine and I am very much pleased and delighted with it. I think it is fine and hope you will continue your fine publication."

HAROLD DOANE.

"AMERICAN FORESTRY is certainly very interesting and I am using it not only for my own information but also in my Boy Scout work."

HENRY O. TILTON.

"Your magazine is getting better and better all the time, and really it is one of the most interesting and valuable monthlies that I know of."

HORACE M. ALBRIGHT,
Superintendent, Yellowstone National Park.

PECANS REPLACE CHESTNUTS

HUNDREDS of thousands of chestnut trees in the Eastern States have been killed by blight in recent years and the American production of nuts is showing a tremendous reduction. In one recent year the importation of foreign nuts into the United States passed the $20,000,000 mark, and the influx is likely to continue until domestic production is heavily increased. The so-called English walnut of California is in increasing supply, and walnut groves in that State are yielding splendid returns. A nut that is in great favor just now is the thin-hulled or paper-shelled pecan, grown in many places in the Lower South and showing its highest development in South Georgia. The paper-shell pecan is of comparatively recent importance in the market, but returns of $400,000 for the South Georgia crop of 1919 indicate rapid increase in production, although there are hundreds of acres in trees too young to bear a crop.

E. A. SHERMAN PROMOTED

EDWARD A. Sherman, of Utah, has been selected to succeed Albert F. Potter as associate forester of the Forest Service. Mr. Sherman has been assistant forester in charge of the branch of lands in the Forest Service since 1915. In 1903, he was appointed supervisor of the Bitterroot Forest Reserve in Montana, as an officer of the Department of the Interior, which was then in charge of the Federal Reserves.

He entered the Forest Service through the transfer of administration of the forests to the Department of Agriculture, in 1905. In 1907, he was promoted to forest inspector, and shortly afterwards was made chief inspector of the national forests in Montana and northern Idaho.

In 1910, after having served in California for something over a year as supervisor of the Sequoia National Forest, he was appointed district forester in charge of the national forests of Utah, Nevada, and southern Idaho. In this district, use of the National Forests for livestock grazing constitutes the leading activity. For this reason the selection of Mr. Sherman to succeed Mr. Potter, an old livestock man, is regarded as evidence that grazing matters will be looked after by one thoroughly familiar with the question.

PLANTING OF MEMORIAL TREES

IN keeping with the movement of the movement of the American Forestry Association for the planting of trees in memory of fallen heroes of the Great World War, members of Company C, 104th Engineers, are planning a memorial planting in Stacy Park, Trenton, New Jersey. A tablet is to be erected in the center of a cluster of six oak trees, to be planted to mark the memory of the six Trenton members of the organization who were killed in action. Another planting of 180 oak trees along the Lincoln Highway is also arranged for, to perpetuate the memory of the 180 soldiers of Trenton and Mercer County, who died in the war. The suggestion of the association has met with favor in other parts of the State, and the number of memorial trees will be greatly increased this Spring.

FORESTERS' NEW WORK

THE manner in which the technical forester is invading the field of the manufacturing lumberman and the wood-using industries in general is shown by the resignation of George H. Cless, Jr., from the faculty of the New York State College of Forestry at Syracuse, to become assistant to the president of the D. H. Gowing Veneer Company, of Portsmouth, Virginia. Oddly enough, he will find in Virginia a former fellow-student at Syracuse. E. H. Vail, who, like Cless, was in the army overseas, and who upon his return established a mill operation in the South. Mr. Cless is known to the entire lumber industry of the country for his work for the National Lumber Manufacturers' Association at Chicago before the war, when he established the central Chicago lumber exhibit in the Chicago building show.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C. (3-5-20)

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

DISCHARGED SAILOR would like position as assistant forester or a permanent position as surveyor with some lumber company with a chance for advancement. Salary is of secondary consideration. Married, so would have to locate in some small town. Have had four years' practical experience in general forestry, and some tree surgery. Address Box 900, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-7)

POSITIONS OPEN

WANTED—Working Assistant Forester for local Forestry Department in connection with forestry work in parks, nursery and landscape planting. Good opportunity for ambitious young man not afraid of work. State qualifications, salary expected and references. Address Box 890, care of American Forestry. (3-6-20)

WANTED—Man capable of Supervising Slack and Tight Barrel Plant; Purchase and Inspect Cooperage Stocks; Develop Boxes, Crates and other Packages for miscellaneous articles. State experience, salary wanted and references in first letter. Address Box 123, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-5)

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UNIVERSITY OF IDAHO

Four Year Course, with opportunity to specialize in General Forestry, Logging Engineering, and Forest Grazing.

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Special Short Course covering twelve weeks designed for those who cannot take the time for the fuller courses.

Correspondence Course in Lumber and Its Uses. No tuition, and otherwise expenses are the lowest.

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FORESTRY SCHOLARSHIPS

THREE students of forestry have been awarded American-Scandinavian Foundation Fellowships, entitling the winners to spend a year, expenses paid, studying forestry in Sweden and Norway. Perry H. Merrill, of the New York State College of Forestry, class of 1917, is awarded a fellowship and has resigned as Assistant State Forester of Vermont to accept. He leaves about the first of July. Bertram Eugene Claridge and Clarence Wilford Watson, both of the Yale Forest School, of Yale University, have been awarded the other two fellowships. Lloyd W. Wise, from the Forestry Department of the Ohio State University, is an alternate. Mr. Henry J. Melony, of the New York State College of Forestry at Syracuse, sent to Sweden last fall as the first American exchange fellow in forestry, is returning to this country after completing his year abroad.

FORESTRY A LAND PROBLEM

"FORESTRY is a land problem, the art of producing repeated crops of timber and other forest products from soils unsuited to agriculture. Forestry is not agriculture, since it concerns itself only with soils which cannot be tilled. It is, however, a kindred art, and between the forester and agriculturist, the land problems of the State and Nation must be solved." This was the declaration of Acting Dean F. F. Moon, of the New York State College of Forestry, in opening the farmers day of Forest Week in April. "Figures show that nearly one-half of the land surface of New York State could be devoted to full production of tree crops and other forest products. We say that no State can truly prosper whose land area is only half productive and one-half idle. In order to make our farm properties produce to the maximum, the owners must consider their woodlots a producing part of the farm. The firewood must be cut where the trees are too thick, or where the removal of the dead, suppressed and diseased trees will improve the growth..

"The marketing of the products of the woodlot is most important, and our wood utilization service is today bringing many farmers producing timber into touch with the best markets. This, we believe, will do more to bring about a right use of the farm woodlot than anything else."

DAMAGE BY BEAVERS

ENERGETIC steps to protect the beauty of Adirondack lakes from damage by beavers, through flooding and killing of timber, are to be taken this season by the Conservation Commission's field force, as a result of an order sent by Commissioner Pratt to all game protectors and forest rangers. These men are instructed themselves to take the initiative hereafter in tearing out beaver dams and destroying beaver houses where extensive damage is being caused to property.

BRICK MEN FOR CONSERVATION

RESOLUTIONS urging conservation of our forests and of timber were passed at the recent annual convention of the Common Brick Manufacturers' Association of America. They urged that National and State Governments put into effect a comprehensive plan for a system of scientific cutting of timber and reforestation—

Because the many buildings constructed of wood have been largely responsible for exhausting the supply of lumber and causing the destruction of forests and standing timber produced by long years of growth and development impossible of replacement without similar long years of growth, if replaced at all;

Because the destruction of much of such growths of timber seriously affects the watersheds of this country, results in an enormous economic loss through lack of fullest conservation of the country's natural resources, and impairs the landscape, scenic effects and privileges of the people;

Because all such timber as can, through scientific cutting and reforestration be spared, should be made available for such of the diversified uses of man than which no other more suitable or satisfactory material is obtainable.

PAPER PULP FROM COTTON LINTERS

A SPLENDID quality of book and bond paper may be made from the waste cotton seed hulls left from the ginning of cotton, as has been demonstrated by recent tests at the Forest Products Laboratory. There is some fibrous matter left on the seed hulls which cannot be removed in the ginning process and this with the hulls makes the finest of wood pulp for high-grade papers. It is of fine texture and is difficult to tear. The study of processes for the manufacture of these fine papers from cotton linters has assisted in arranging for the sale of 700,000,000 pounds of linters acquired by the Government for making explosives. Now that explosives are no more needed and that the Government has this vast amount of left-over material on hand, its utilization in paper making is of great commercial importance.

HOW TO MAKE SOUTHERN WOODLANDS PROFITABLE

A BULLETIN "Making Woodlands Profitable in the Southern States," containing numerous illustrations has been prepared by forestry specialists of the United States Department of Agriculture for the benefit of southern farmers interested in making their woodlands more profitable. It contains suggestions regarding the marketing of many kinds of logs, and calls attention to the importance of wise cutting. The need of protecting seedlings in woodlands is emphasized, and the wasteful stripping of land, such as has laid bare so many slopes, is condemned. Photographs show the evil results that follow short-sighted practices.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

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VISIT OUR NATIONAL PARKS!

On the way to Cripple Creek.

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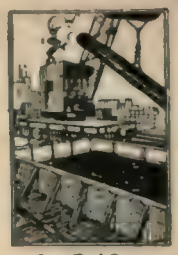
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Treating Fence Posts

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A timely talk of interest to all users of structural wood



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EVERY form of business depends more or less upon lumber. No other material lends itself to so many uses. The beauty and comfort of our homes, the very existence of our railroads, the economical handling of manufactured goods, the benefits of a free press—the entire prosperity of the nation, in fact, is built up on a plentiful supply of this most necessary material.

Our Vanishing Forests

Within a century, our forests have been reduced from 850,000,000 acres to 150,000,000. We are consuming lumber at a greater rate than ever before. Replanting is a matter of years, while our vital need is to protect our present supply. *Conservation* and *preservation* must join hands—*you* must do your share by preserving from decay every stick of lumber that you use.

Carbosota is a wood preservative that every lumber buyer, large or small, can employ with profit. Its application is simple, and it has the effect of greatly prolonging the life of wood at a cost far below that of replacing it after it has decayed.



Decayed flooring, side and intermediate sills of freight car.

On the Railroad

The

Reprinted from Lumber World Review, March 25, 1920 Issue

"A Valuable Opinion on 'Forest Devastation' from Henry S. Graves, Former Forester



'We recently received a letter from Henry Solon Graves, now ex-forester of the United States Forest Service, Department of Agriculture, Washington, D. C., which we consider altogether the most substantial statement Mr. Graves has ever made on the subject of forest devastation. Here it is:

'We must take our choice between stopping forest devastation and lessening prosperity. Do we want to sink to the condition of the European countries, where scarcity and high cost of wood handicap industry and human comfort? We must decide now.....

'Timber must not become an imported luxury in the United States. We must apply the American spirit of development in stimulating production—but at the right point. We must neither lock up our forest resources nor butcher them, but make the most of them. Not restrictions on the use of timber but efficient use of land to grow timber and efficient use of the timber itself is the true way out. The first step is to call a halt on the present devastation of timber-growing land. We are letting use and ruin go hand in hand.

'I am urging that all the interests concerned join in a drive, not to stop the use of timber but to stop waste...

'The conservation of timber by extending its life in use is true forest conservation. We must do everything that science and ingenuity can devise to increase the usefulness and prolong the life of wood. I am heartily in accord with every sound effort that is being made to extend the longevity of timber in various industrial uses.....The conservation of ... through better methods of using it ... the whole scheme of forest co...

The Farmer and County Agent

The rise in lumber prices has hit the farmer as well as every other user. If he buys lumber it costs nearly double what it did. If he cuts his lumber from the wood-lot, the increased value of his own or hired labor has boosted the cost until it is just as essential for him to prolong the life of his own lumber as for any other user of wood.

Usually the county agricul... agent will gladly show the farmer ... to save money by wood preser...

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ing poles ... nt ...

the lumber. For larger work, where suitable equipment is obtainable, the Open Tank process, which consists in the immersion of the lumber in hot and cold baths of Carbosota is naturally more effective, although more costly



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AMERICAN FORESTRY

VOL. XXVI JUNE 1920 NO. 318

EDITORIAL

STATE FORESTS IN MASSACHUSETTS

AMERICAN FORESTRY has frequently emphasized the necessity for a constructive plan to keep the large forest areas of New England productive. One of the most far-sighted and promising steps in this direction is the proposal now brought before the Legislature of Massachusetts by an initiative petition bearing the signature of 31,000 citizens of the State for the purchase and reforestation of 250,000 acres of her idle forest lands. Massachusetts, which has been forced to import steadily increasing quantities of timber from the Gulf Coast and the Pacific Northwest, has within a stone's throw of her teeming factories a million acres of burned and cut off timber land now producing but a small fraction of the wood which it might grow. Much of this land was once part of the wonderful white pine forests which greeted the Pilgrims.

The plan proposed strikes directly at the problem presented by this enormous acreage of idle land in the heart of one of the most highly developed manufacturing sections of the country. The State will not only buy a quarter of the land, but will immediately restock it so that within ten years the areas purchased will be growing timber at their full productive capacity. The scheme is particularly significant in this respect. While other States have acquired or retained cut off timber land, the planting of denuded areas is proceeding slowly. Massachusetts proposes not only to enter the first rank of forest owners but immediately to make her State properties highly productive forests.

The broad financial basis of the scheme will also commend itself to all those who believe in an aggressive attack upon our national forest problem. Current revenues to the State are not mortgaged and tax burdens will not be increased. The enterprise, including even the current protection of the new forests, will be carried by serial bonds until sufficient revenues are obtained to liquidate capital charges and make the project self-supporting. In other words, the State will become the owner of an exceedingly valuable forest property simply by the loan of its credit.

The calculations of yield and ultimate returns upon which this proposal is based appear sound. Regardless of detailed figures, it is doubtful if anyone can question the fundamental soundness from a purely financial standpoint of a long-term investment of this character in a region where unused forest land is so cheap, where tree growth is so rapid, and timber values are so high. Nevertheless, no one should lose sight of the fact that the greatest return to Massachusetts will not appear on the ledger of its timber purchasing account. The production at home of a large quantity of timber needed by the industries of the State, the effect of a large local production upon lumber prices in a competitive market partly supplied from outside sources, the stimulus given to the reforestation of similar land by private owners, the public benefits of large areas of State forest at the doors of densely populated towns for health and recreation—these in the long run will be the greatest returns.

The Massachusetts Forestry Association is to be warmly commended for the far-sighted initiative which has now made it possible to bring this plan in concrete form before the people of the State. Every advocate of forestry should support it. There are few things which Massachusetts could do which would contribute more to the security of her industries in the future or to the general welfare of her people. And in the adoption of this measure, Massachusetts will set an admirable example to many other States, confronted with the same problem of idle forest land and excessive prices on imported lumber, in the constructive solution of a difficult problem.

GENERAL WOOD FOR A FOREST POLICY

IT is well to know, in advance of election, the views of any candidate for office, and the question of State and National forest policies. An appreciation of the value of forests; an acknowledgment of their vital importance; and a desire to aid in measures to perpetuate them is what is expected of every good citizen. It is, therefore, not surprising that Major General Leonard Wood, long a member of the American Forestry Association, a close friend and confidant of Colonel Roosevelt, who was an ardent advocate of forestry, should in a letter to President Charles Lathrop Pack, of the Association, voice his sentiments in the following pertinent paragraphs:

"I am heartily in favor of a National and State legislative program which will provide for the perpetuation of our forests so that there will be a sufficient supply of forest products for our future needs, as well as ample forests for the protection of watersheds and for the recreational needs of the people.

"The steady decrease in our forested land, the losses by forest fires and disease, the growing acreage of cut-over lands unforested but serviceable only for forests, all emphasize the need of a forest policy which will provide for proper protection of our forests, for reforestation, and for investigation to determine the best means of perpetuating them.

"Our citizens have in the last two years been brought to a realization of what a vital factor in the prosperity of the country our forests are; they know how greatly our forest holdings have been decreased and they appreciate the danger of the disappearance of our forests. It is time, therefore, for prompt action, so that our forests may be so managed and protected, that they yield timber as a periodical crop, and that our waste lands be restored to forests wherever possible."

MORE FEDERAL FOREST LAND URGED

FURTHER purchases by the Government of forest lands in the Southern Appalachian and White Mountains to relieve the present shortage of timber in those regions are advocated by the National Forest Reservation Commission in a report just issued, entitled "Progress of Purchase of Eastern National Forests." This commission is the body authorized to pass on timberland purchases made under the Week's law, and is composed of the Secretaries of Agriculture, Interior, and War, and four Members of Congress.

"The supply of spruce in the eastern United States available for paper stock is nearly exhausted," the publication states. "Eastern building material is no longer adequate fully to meet industrial demands, the future supply of hardwoods is threatened and will not be sufficient unless prompt measures are taken for maintaining the productivity of the hardwood forests."

The situation can be helped materially, says the report, by arranging that lands not suitable for agriculture—of which there are 30,000,000 acres in the eastern mountains—shall be used for growing timber. Of this 30,000,000 acres approximately 1,800,000 acres have been purchased by the Government under the provisions of the Week's law, which authorizes the acquisition of lands on the headwaters of navigable streams for inclusion within national forests.

Appropriations totaling $11,600,000 have already been made under the Week's law, and the expenditure of all but about $300,000 of the amount available for purchasing lands has been authorized by the commission. Twenty-one purchase areas, with a total area of approximately 7,000,000 acres, have been designated in nine States in the important hardwood and spruce regions of the Appalachian and White Mountains. In 17 of these, purchases have been made. Since the purchase program was developed other States, including Kentucky, have enacted legislation authorizing the acquisition of lands for national forest purposes. To carry out the purchase program as outlined by the commission an appropriation of $2,000,000 per year for a period of five years, beginning with the fiscal year 1921, has been recommended by the commission.

The average price of the 1,841,934 acres whose acquisition has been authorized by the commission is $5.26 per acre. The Government is getting good value for its money, the report states. While some of the lands purchased have been cut over and burned, but at present support a stand of young timber from which no immediate returns can be expected, others have a large amount of merchantable timber. All of the lands bought are capable of producing valuable crops of timber. During the fiscal year 1919 receipts for timber sold from the area then acquired—1,347,660 acres—amounted to $71,942 under the conservative method of cutting practiced by the Government. The timber that was sold was very largely salvage, and it is expected that the returns from timber sales will steadily increase.

In addition to the financial return, the establishment of national forests results in a decided benefit to navigable streams through the modifying influence of the forest cover on erosion, according to the report. It states that the newly created forests are being widely used for recreation by residents of the near-by cities and that they are meeting other important economic needs. Watersheds which supply domestic water to seventeen municipalities are owned in whole or in part by the Government. In addition, twenty-nine municipalities secure their water supply from lands which have not yet been acquired but which are located within the forests. Government control assures the sanitation of such watersheds without interfering with the use of the land for timber-producing purposes.

PAN-PACIFIC SCIENTIFIC CONGRESS

A PAN-PACIFIC Scientific Congress is to meet at at Honolulu from August 2 to 20, 1920. Its purpose, in the words of its chairman, Herbert E. Gregory, of the Bernice Pauahi Bishop Museum at Honolulu, "is to outline scientific problems of the Pacific Ocean region and to suggest methods for their solution; to make a critical inventory of existing knowledge, and to devise plans for future studies. It is anticipated that this congress will formulate for publication a program of research which will serve as a guide for co-ôperative work for individuals, institutions and governmental agencies.

It is to be hoped that forestry will receive its fair share of attention in the proceedings of the congress. The United States has a very real interest in knowing more than at present of the forest resources of the Pacific Islands and shore lands. This is true not only because of our forest holdings in California, Oregon, Washington, Alaska, Hawaii, and the Philippines, but because with the growing depletion of our own timber supplies, the resources of other countries will become of

steadily increasing importance to us. Moreover, even should we adopt a comprehensive forest policy which will assure us a sufficient timber supply to meet our own needs and leave a comfortable surplus for export, we shall undoubtedly wish to develop timber trade relations with other countries in and bordering the Pacific. Douglas fir from the Northwest, for example, should find a ready market in Australia and other countries poor in softwoods, while in return we may wish to import hardwoods from them. The world is constantly growing smaller, and as trade becomes more and more international in character there will be an increasing interchange between countries of forest products as well as of other commodities.

All of this means that there must be far more knowledge than is now available as to the forest resources of the world. The Pan-Pacific Scientific Congress offers an excellent opportunity to formulate a concrete program for securing scientific information of this sort. Such a program should include investigations of the extent and character of the forests; of the identification, properties, and value of the trees composing them; of their utilization and management; and of the many economic problems involved in the development and maintenance of an international trade in forest products. The undertaking is one of enormous magnitude and calls for the best brains and the most cordial co-operation of all those interested to carry it to completion.

In all probability, the congress will be attended by forestry representatives from Hawaii and the Philippines. American Forestry wishes to urge the importance of having similar representation from the United States proper. Surely the forest problems of the Pacific are of sufficient interest to this country to justify the Federal Forest Service in sending one or more representatives. Delegates might also be sent to advantage from the forest schools, at least two of which now offer instruction in tropical forestry. The first of August is only two months away. It is none too early for the Forest Service and other interested organizations and individuals to begin to formulate plans for active participation in the congress.

FORESTRY IN AUSTRALIA

THAT Australia is much better off regarding future supplies of lumber than is the United States, is the assertion of V. B. Trapp, of Melbourne, president of the Victorian Forest League. In a letter to the editor of AMERICAN FORESTRY, Mr. Trapp says:

"There is no doubt the world is threatened with a timber famine, and the only way to bring this home to the public is through forestry associations. We here are certainly better off than you, although we have not nearly sufficient forests for the future generations. Taking it all through in Australia, 90% of the forest lands are still held by the Government. There is not 10% privately owned. You can well judge how important this is and also how fortunate Australia is not to have alienated its forests. By proper supervision, 30 to 40 years should see Australia in one of the best positions as regards timbers. Again, fortunately for us, our hardwoods, which are beginning to be appreciated, regenerate themselves. Our shortage is in softwoods and we have ample land for the proper growing of the pines."

If 90% of the forests of the United States were owned by the Government and the States, and there were ample appropriations for reforesting cutover lands and protecting the forests, this country would also in a moderately short time be able to assure future generations of sufficient supplies of home grown timber for our future needs.

SWEDEN SETS US A GOOD EXAMPLE

THE impression made upon an American student of Forestry by the practice of forestry in Sweden is interesting reading, now that the need of a forest policy in this country is receiving so much attention. W. Stuart Moir, of Yale Forest School, who holds an American-Scandinavian Fellowship and is studying forestry in Sweden writes:

"The longer I stay in a country where technical forestry management is practiced, the more strongly the appreciation of what it means to the welfare of the country is impressed upon me. May we in America stir ourselves and make an honest attempt to solve the question of developing a rational forest policy before we suffer staggering losses through our continual practice of exploitation and waste.

"The American Forestry Association is the medium through which the work of education can be carried out which will lead to construction legislation along these lines. It is great to see the way you are taking hold of the task."

AS IF TIMBER WAS INEXHAUSTIBLE

IF all our citizens had the same clear sighted point of view regarding the forest situation as has the editor of the Chattanooga, Tennessee, *News*, no further propaganda for a national forest policy would be necessary —we could proceed to secure the necessary legislation at once. He says, in commenting editorially on items sent him by the American Forestry Association to show the need of a national forest policy: "We use and waste timber as if the supply were inexhaustible. When some one rises up to tell us the danger of the speed at which we are traveling, we listen languidly for a brief while, then proceed with the dance." He goes on to say further "Americans found a continent well timbered. They have used forest products with a lavish hand. There has apparently been an impression that we couldn't get along with less. We shall have to learn the lesson however for the end of our supply is in sight."

THE USE OF AIRCRAFT IN FORESTRY

BY ELLWOOD WILSON

OFTEN, in years gone by, when trying to make maps of the immense tracts of forest land in Canada with the thermometer at 50 below zero or the black flies and mosquitoes eating one alive, the writer wished for a balloon. The labor required to get supplies into the woods, the hardships to be overcome, the toil required to map a few square miles of rough, heavily timbered country and the amounts expended seemed so out of proportion to the results obtained. One party of ten men used to do 50 square miles a month at a cost of about fifteen to sixteen dollars per square mile, and we mapped 2,800 square miles. Then the timber estimates had to be made, which involved tramping through the woods, calipering and estimating the trees and trying to find accurately the dividing lines between types.



FOREST PHOTOGRAPHED FROM THE AIR

1—Woods Depot. 2—Lake. 3—Dam. 4—Booms. 5—Log Road. 6—Logs left on shore of lake. 7—White and Yellow Birch, few conifers. 8—Stand of Conifers. 9—Shadow of hill.

Now the dream has come true and in Canada with its myriad lakes, the flying boat, equipped with the Eastman K-1 aerial camera, just a glorified motor-driven "kodak," is doing in hours what it took months to do on the ground.

Thanks to the generosity and broad-mindedness of the Minister of Naval Affairs, Mr. C. C. Ballantyne, who loaned two HS2L flying boats, and the Hon. Jules Allard, ex-Minister of Lands and Forests of Quebec, and the St. Maurice Forest Protective Association, who together subscribed $12,000 for the work, the writer was enabled to try experiments in spotting forest fires and making photographic maps of the forest.

The two seaplanes were assembled at the Station at Halifax and flown across Nova Scotia, New Brunswick and Northern Maine to Lac a la Tortue, Quebec, by Lieutenant Stuart Graham, of the British Navy. These two trips of 750 miles each were made without any mishap whatever. Unfortunately by this time the worst of the forest fire season was over so that there were only two opportunities to see forest fires. It was found that they could be seen at a distance of twenty to thirty miles and that by flying to them one could see just the state of affairs. In one case we saw the men who had lighted a fire. The moral value of the planes in fire prevention is something to be considered, for if people find that they can be seen from a flying machine setting fires they will be less apt to be careless in the woods. Then, too, never knowing just when a plane may appear, or from what direction, incendiaries will most certainly become less numerous.



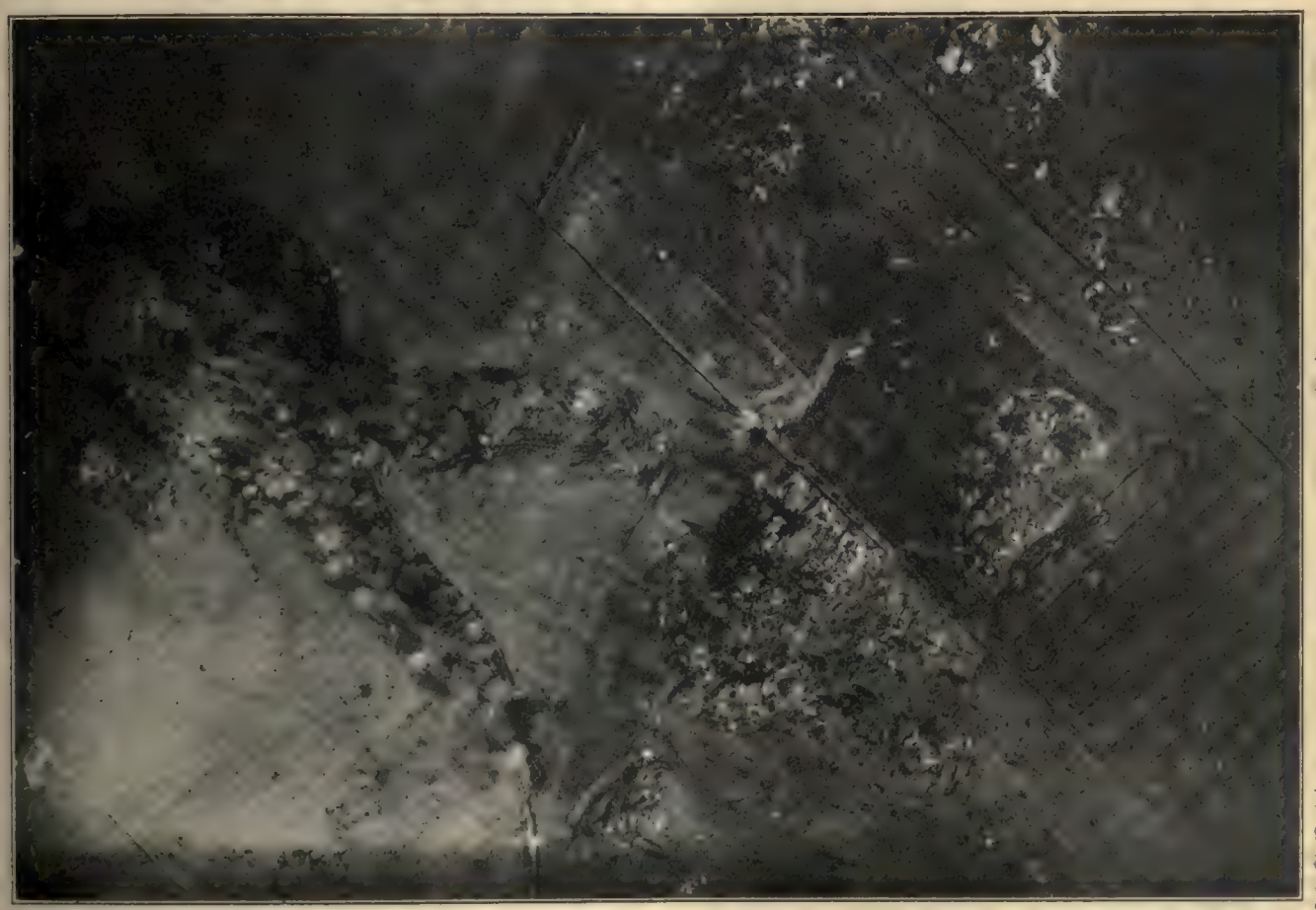
PART OF ST. MAURICE RIVER, QUEBEC

1—Logs in boom and loose in river. 2—Skating rink. 3—Lumber piled in yard. 4—Saw mill, Belgo Canadian Company. 5—Bridge. 6—Concrete Road. 7—Railroad.

A small gasoline pump, which can easily be carried by two men, with 1,500 feet of 1½-inch hose was constantly in readiness at the station to take to a fire if needed.

It was wonderful, in flying over a wooded country, to see how easily the boundaries of the various timber types could be traced and by taking a map into the air, the various types, the approximate size and density of the timber could be esaily sketched on it, and that, too, much more accurately than from a ground reconnoissance. One afternoon, flying over a tract of fifty square miles which had been carefully mapped a few years before, I found a small lake which had not been located by the field party, and although I had often been over the tract on foot, I brought back more information in the hour I was over the tract than I had previously gathered. In flying over a tract which we contemplated purchasing, we were able bi-weekly aerial photographs of the log drives so that it can see at once what progress has been made and whether the rivers have been swept clean. By noting the points where the logs jam and stick it will be possible to make plans for the removal of obstructions, the building of piers and other river improvements.

Photographs are taken at the speed of about sixty miles an hour, which means about one hundred pictures in that time covering forty-five square miles—about as much country mapped in one hour as a crew of men will do in a month and with much more detail and accuracy and giving at the same time, directly from the picture, the areas of lakes, of burns, of swamps and of the different types of



PHOTOGRAPH OF FOREST AND FARM LAND TAKEN FROM AN AIRPLANE

The skilled observer is enabled by such a photograph as this to map in one hour as much country as a crew of men can do in a month and at one-tenth the cost and with much more detail and accuracy, giving at the same time the areas of lakes, swamps, of burned land, and the different types of timber.

in one afternoon to see that it did not contain enough timber to warrant paying the price asked.

The different species of trees shown up with remarkable clearness from the air and the topography, camps, roads and trails can be seen, and the shallows in the lakes and rivers can be picked out. Logs left in the rivers and lakes by the drives of the previous year can be readily seen and photographed and if the number in a unit area on a photograph are counted and the area measured with a planimeter, a much closer estimate of the number in any body of water can be obtained than by having a man look at them from the shore and guess.

It is the intention, during the coming season, to take timber. The cost of the aerial work too, is only about one-tenth of that of the ground work. The photographs are eight by ten inches and the best altitude for this work is about five thousand feet, which gives a scale of 400 feet to the inch.

We have a party in the woods now studying the interpretation of the forest photographs and have already found that we can draw the boundaries of the timber types with great accuracy, and that in many cases we can draw contours. Individual trees in the photographs can be easily located and species can be distinguished. We are now studying areas which seem to be typical on the photographs, calipering every tree which enters the crown

cover and getting the number of trees of each species and their heights. When this work is finished we shall have a reliable legend for reading the photographs. We have another party studying photographs taken over brush and farm lands which it is proposed to buy for reforestation and find this photographic work of the greatest value. Building, lot lines, cleared land, swamp, brush, roads, fences(stump land and drainage ditches all show up with remarkable clearness, and photographs are most useful in buying the land as they give more information than the owner has himself.

The illustration shows a photograph which was taken at a low altitude of a piece of land which had actually



A CONTOUR MAP OF THE AREA COVERED BY THE PHOTOGRAPH ON THE PRECEDING PAGE

had a contour map made of it (see page —), and the contrast is very interesting.

For making maps and estimates of the enormous areas in eastern Canada which have not yet been surveyed, aerial work will prove of the greatest value and will make it possible to secure in a very few years information about the timber lands so sorely needed and which cannot be had in any other way except at a prohibitive cost and after many years of labor. It is proposed during the coming season to cover from three to four thousand square miles of territory and if other companies which are contemplating similar work carry out their programs a very large area will be covered by the end of the summer. Aerial work will also prove of value in studying the problems of water storage for power and irrigation projects and for the location of new railway lines and cut-offs for existing lines. The planes will also be of value in logging operations, enabling the superintendent to make more frequent trips to his operations and to keep in closer touch with his men. Then in case of accidents in the woods, the injured can be brought out without delay.

Little has been said about the value of the planes in fire-protection as we had little opportunity to demonstrate it, but from the work done in the west and my own experience in sighting a fire from the air and investigating its origin, I feel sure that the planes will soon do away with ground patrols almost entirely.

Aerial work is bound to be of great use in many ways in the near future but I venture to say that in no department will it prove of more value than in forestry, especially in giving what is so sorely needed—a sufficiently accurate inventory of forest resources in a reasonable length of time and at a reasonable cost. It will do away with much of the drudgery and monotony of forest reconnoissance.

HOW FIRES DESTROY OUR FORESTS

BY J. V. HOFMANN, U. S. FOREST SERVICE

THE destruction of a forest may be accomplished in one spectacular conflagration. Such an event will be universally regarded as a lamentable calamity. Public sentiment will be greatly aroused and sympathy will be vividly expressed. The loss in forest wealth, in personal property, and often in human life inspires a grim determination in those directly affected to prevent the recurrence of such a catastrophe. But, all too soon, the public feeling grows calm again, the distressing event is forgotten, and another stage is set at once for a repetition of the tragedy. This, moreover, has been the history of all the great forest fires that have taken place in the United States of recent years. However, these stern events are not so quickly forgotten in the forest itself; in the very trees are found the records of all the fires that have occurred for generations past.



WHERE NATURE IS GIVEN A CHANCE

A stand of mature yellow pine with a splendid understory of yellow pine which makes a complete stand when the large timber is removed. Second growth comes in under the mature forest when fires are kept out. Crater National Forest, Southern Oregon.

While these great historic fires have attracted the attention of the public, there are other types of forest fire which, although they excite little interest or fear, are slowly but surely causing the destruction of the forests. The most common among these is the surface fire, which is often the result of "light burning." It is sometimes carelessly set or even maliciously started for personal reasons. However they originate, the final effect of repeated fires is the same: a forest can not perpetuate itself when the young growth is annually or even less often destroyed by fire.

The successive stages in the destruction of a forest by fire are recorded in the appearance of the forest. Certain outstanding features, perfectly evident even to the untrained observer, characterize these successive stages in progressive destruction. The first stage is marked by the occurrence of the native forest in patches, on the same slopes, in the valleys, or in the moist situations. The second stage is indicated by the presence of remnants of the preceding forest either in standing snags or down charred logs in the midst of the even-aged growing and seeding stock. The third stage is characterized by the young trees, not yet seeding, but in even-aged, well-stocked stands, with here and there the standing snags of the preceding forest. In the fourth stage there is young growth, with the seedlings either standing alone or in small groups. The fifth stage shows seed trees, but with the trees of seeding age scattered or in groups. In the sixth stage the area is covered with brush or grass. The seventh stage is that of the barren area or the eroded slope. This is the general order of transformation when successive fires convert a productive forest into a barren waste. The manner and the time of the occurrence of each of these changes are clearly



A FOREST WITHOUT A FUTURE

No reproduction under mature stand of yellow pine. Young growth has been destroyed by surface fires. Note fire scar on tree marked X. Exposed dry slopes will seldom reforest naturally after the timber has been removed, and artificial restocking is difficult and expensive. Crater National Forest, Southern Oregon.

recorded in the forest itself. The records are carved by the passing fires on the scarred veterans that remain. On areas where the process is not yet complete, the marks of the various stages are clearly distinguished. When fire injures a growing tree but, does not kill it, the wound grows over. The burned spot, however, remains as a dead area, and the annual rings are formed around it. By counting the new growth rings, the date of the fire that caused the wound may be determined. Most large trees show clearly the effects of the many fires they have survived during a period, perhaps, of more than three centuries.



COUNTING GROWTH RINGS TO DETERMINE DATE OF FIRE

Twenty-three rings since the fire scar was inflicted shows that the fire occurred 23 years ago. Rainier National Forest, South Central Washington.

The occurrence, destruction, and after-effects of fire in the forests of the Pacific Northwest have been studied by the investigators of the Wind River Experiment Station during the past seven years. The data obtained lead to the incontrovertible conclusion that any fire is a dangerous enemy to the forest, and that the amount of destruction it may cause depends upon the type of fire into which it chances to develop. The discussion in this article of the various stages of forest destruction is a summarized explanation of how and why forest growth is eliminated by repeated fires just as surely as though that destruction were accomplished by a single fire.

The complete destruction of a forest by a single fire is the most conspicuous type; hence it has been regarded as the first step in the process of deforestation. The destruction of a mature forest by a single fire would reduce much of the forested area to brush fields or barren wastes were it not for the adequate provisions of nature for restocking such areas in large part. A mature forest usually produces some seed annually and heavy crops periodically. A large part of the seed produced is eaten by rodents, but these same forest inhabitants store away seed in the duff and soil of the forest floor for their future use. Some of these stores are not needed or are not found in the deep duff after the winter is over, and so they remain in the cool, shaded forest



Photograph by Wernsted.

HOW A SINGLE FIRE CAN DESTROY A MATURE FOREST

Note the bare ridge on the left-hand side of the view (south slope) where the fire was hottest. The right-hand side shows young growth coming in on the north slope. View on "Yacolt burn" of 1902, in South Central Washington, where more than half a million acres of forest were destroyed.

floor for long periods, sometimes for eight years or more. When the forest is destroyed by fire the seeds stored in the forest floor are usually not all destroyed. The sunlight and warmth which reach the soil after the forest is removed soon cause the seeds that lived through the fire to spring to life, and the forest is replaced as if by magic. This accounts for the young stands found in some of the large burns where no green trees were left for seed trees. A notable example is the well-known "Yacolt burn" in southern Washington, which occurred in 1902. Although a forest of more than half a million acres was completely killed, this area is now clothed with a magnificent stand of young growth, which sprang up immediately after the fire from seed that was stored in the forest floor. The entire forest is destroyed only when an exceptional combination of conditions exists. Long dry periods preceding a fire and a strong wind accompanying a fire will produce conditions favorable for developing a crown fire. When crown fires are carried before a wind in mountainous country the slopes facing the direction from which the fire comes will usually be completely burned, but patches of green timber may be left on the opposite slopes, or in the valleys, or in moist situations.



TRYING TO COME BACK

One and two year old knob-cone pine seedlings are growing under a small seed tree that was killed by a fire two years before the picture was taken. Such groups of reproduction disappear with the next fire. Crater National Forest, Southern Oregon.

Only occasional mature trees are killed by surface fires, but the fire gets into the bases of a number of the trees through cracks in the bark and through pitch pockets, and fire scars result through which diseases enter and cause rots and loss of timber.

These surface fires also destroy seed and cones and prevent an accumulation of litter, which is the storage



THE SOUTHERN SLOPE IS THE FIRST TO BECOME A BRUSH FIELD

On account of dry conditions the southern slopes suffer more severe fires and, also, are more frequently burned. The usual condition in this stage of fire destruction is shown by timbered northern slopes and brushy southern slopes. Crater National Forest, Southern Oregon.



TRAIL THROUGH A SPLENDID STAND OF YOUNG GROWTH

Natural young stand of Douglas fir that followed a 1902 fire where a mature forest had been destroyed. Rainier National Forest, South Central Washington.

bed for seed and moisture. Young growth that may have started in openings among the trees is destroyed wholly or in part by surface fires. The recurrence of such fires in the mature forest eventually destroys it, and, with the young growth destroyed, there is no provision for replacement.

The chances for young growth following a large fire are best in a mature forest, and the next best conditions are found in a growing forest that is producing seed. This has been characterized as the second stage of forest destruction. A forest 25 to 100 years old is producing seed long before it is mature for cutting, but during its younger stages the forest floor differs from that of the mature forest in that the duff is shallow and the conditions for seed storage are not so favorable. A fire that destroys a forest of this type usually is hot enough at the surface of the ground to kill most of the stored seed. The result is a scattered stand of young growth in place of the dense stands that follow fires in mature forests. Surface fires cause a great deal of damage to forests during the younger stages because the bark of the trees is still thin and the cambium layer inside of the bark is easily killed. Fire scars result, which cause serious defects in the butt logs as the trees grow larger. A severe fire may cause the complete destruction of the forest during this period and even light fires cause permanent damage to the present stand as well as the destruction of young growth.



RESULT OF A SECOND FIRE IN YOUNG GROWTH

A 1902 fire, which killed a mature forest, was followed by a good stand of reproduction, as shown on the left. In 1910 a second fire killed parts of the stand of young growth, and a barren area resulted, as shown on the right. Oregon National Forest, Northern Oregon.

The third stage is taken as that most critical period through which the coniferous forest passes in perpetuating itself. This covers the time from the beginning of a stand to the time it reacher seeding age. If it is destroyed during this period, there is no provision left for its renewal. There has been no seed produced, and the seed that lived through the previous fire has all germinated. The well-stocked stand of young growth on the "Yacolt burn" is in this stage at present, and it must be safeguarded from fire. There are many such



THE LAST CHANCE DESTROYED

The killed Douglas fir saplings were the future seed trees on this area. There were on an average 160 trees to the acre. All forest growth disappeared from this area because fire killed these trees before they had reached seeding age. Crater National Forest, Southern Oregon.



DENSE REPRODUCTION

Douglas fir, noble fir, Western white pine, and hemlock 40 years old, following a single fire that destroyed a mature stand.

areas in the Pacific Northwest forest region now.

The next or fourth step in forest depletion comes when a fire runs through a stand of young growth and leaves patches unburned. A sparse stand of young seedlings in brush or in open burns is too often considered of little or no value. Such seedlings should be regarded as the future seed trees of those areas and should be protected in order that the areas may be restocked again. This process of reforestation, however slow, will eventually restock an area if fires are kept out. Surface fires kill such seedlings and leave the area as a brush tangle without any chance for natural reforestation.

There is another stage in which single seed trees or groups of trees were left by the fire that killed the forest, but in which all reproduction has been destroyed by subsequent fires. This may be considered as the fifth stage, and it is the last one in which the forest has any chance of natural reseeding. During the process of destruction in a forest single trees or groups of trees sometimes escape. These remain as outposts around which a forest may again develop. Seeding by wind-blown seed occurs for short distances only from the parent tree. Surface fires will usually not kill these single veteran trees; but repeated burning prevents seedlings from getting established around them, and each fire claims some of the seed trees. Wherever one of these trees is removed by fire or windthrow another section is added to the brush area. By the occurrence of periodic fires the entire area soon becomes a nonproducing, though still a potential, forest area. Many such brush fields occur now in Southern Oregon and in the Cascade Mountains of Oregon and Washington.



VARIOUS STAGES OF FOREST DESTRUCTION BY FIRE

Scattered stand of a young growth that followed the destruction of a young forest which had reached seeding age. Rainier National Forest, near Mt. Adams, South Central Washington.

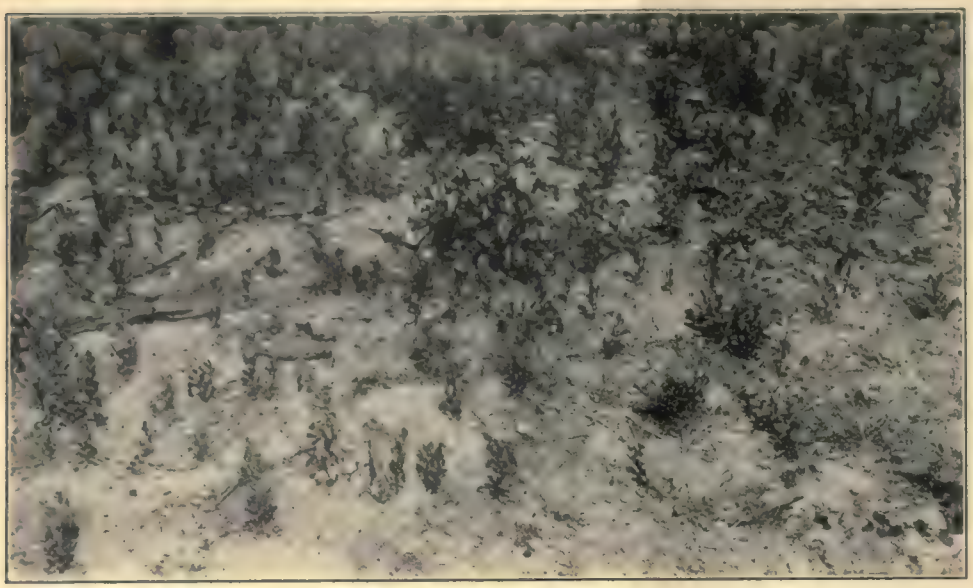
The sixth successive stage from the mature forest is the result of the consistent recurrence of fires which inevitably reduce the forest to a brush area. The presence of this almost impenetrable mass of brush has led to the attempt to clear the area by fire. Usually the reasons for the presence of the brush or the ultimate result of clearing the area by burning are not considered. The very evident fact that the land is clear of brush after a severe fire is considered sufficient basis for using fire as the clearing agent. That the fire may only intensify the stand of brush and postpone the time when the land will be reclaimed by the forest is not given any weight in the justification of its use. Examinations of brush areas after several fires show that some of the



THE FOREST GIVES WAY TO FIRE

Area burned over repeatedly. Only an occasional seedling of the most fire-resistant species, lodgepole pine or white bark pine, left.

persistent species reappear immediately after the fire in denser formations than before. Manzanita has been found to produce as high as 95 new shoots from a single burned stump. Other species of manzanita and chamise are prolific seeders, and the seed lives through the fire. Stands of 90 seedlings to the square yard have been noted where but one bush to the square rod grew before the fire. Ceanothus, rhododendron, and vine maple, as well as most shrub species, survive these periodic fires and form these formidable thickets.

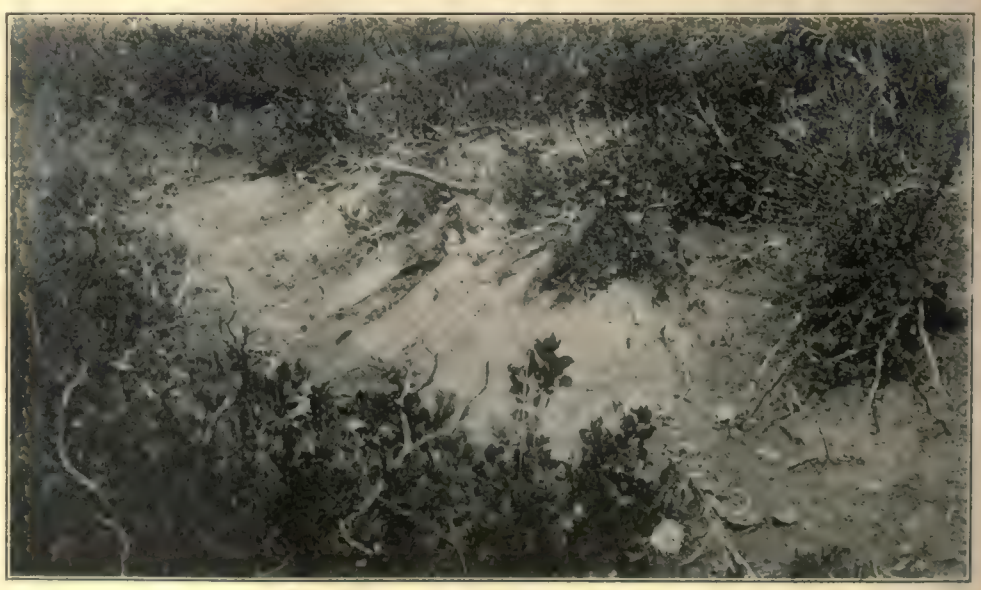


HOW BRUSH FOLLOWS FIRE

A stand of 91 seedlings to the square yard of manzanita has grown up where only one bush to the equare rod stood before the fire. Crater National Forest, Southern Oregon.

While the brush areas represent the last stage of the forest, they must also be considered as advance agents of forest establishment. On severely exposed slopes and in such regions as southern Oregon the forest-tree seedlings require some protection to become established. Striking examples are shown in the establishment of yellow pine seedlings in the Crater National Forest in southern Oregon where 95 per cent of the young seedlings were found established under bushes of chamise and manzanita. A brush cover not only insures better moisture conditions but also offers shade to the young seedlings. An area which had not been burned for 20 years had a moisture content of 6.2 per cent in the surface soil and 4.25 per cent at a depth of 6 inches when it was examined during the most severe dry period in August. This is sufficient moisture for the establishment and growth of tree seedlings. An area burned one year previous to the examination had only .87 per cent of moisture in the surface soil and 3 per cent at a depth of 6 inches. These data show that seedlings could not become established on this area because the moisture in the surface soil is less than the seedlings require. In this way the brush gradually prepares the way for the return of the forest. To accomplish this, however, fires must be kept out.

The final or seventh stage is reached when all growth except annuals and some grasses has been distroyed by repeated fires. The barren appearance of the slopes and ridges has inspired the too common name of "Bald Mountain" in this region. These mountains are monuments to the menace of repeated fires, whether these fires are started by intent or through carelessness. Where the fires have recurred in such close succession as to destroy shrubbery as well as forest growth serious erosion has resulted. These eroded slopes are not only non-productive but detrimental to the conservation and purity of the water supply. The muddy waters are a serious menace to irrigation projects because of the silt deposits that are made in the reservoirs and ditches. By the exclusion of fire the conditions favorable to tree growth are gradually re-established through the reclamation of the area by brush. This is a necessary step in the succession of plant life in this region—a fact that has been demonstrated by the establishment of tree seedlings under brush and their failure to establish themselves in the open. Fire



THE LAST LINE OF DEFENSE

Erosion is held in check by the brush, but gullies have begun to form. Crater National Forest, Southern Oregon.

protection on cut-over areas is even more important than on the forest. The cut-over areas are, up to the present time, in the most productive timber regions, and timber growth is more rapid on these areas than on the mountain slopes. A great deal of the young growth that follows logging operations in the Douglas fir region has come from seed that was stored in the forest floor before the timber was cut. On areas where the slash and debris left after logging were burned at a time when the forest floor was moist enough to save some of the stored seed, good stands of young growth sprang up. The large areas of logged-off land that are barren have been made so by repeated fires. As shown previously, when the young stands burn there is no seed left to restock the area, and the method of clear cutting removes all seed trees. In order to restock these cut-over lands the slash should be burned the same season in which the logging is done and at a time when the forest floor is moist enough to prevent the soil from getting too hot. In this way reproduction usually follows the fire. The areas must not be allowed to burn over a second time.

The important facts about the destruction of a forest by fire and the reasons for protecting the forest throughout its various stages of development may well be recounted.

When the mature forest has been destroyed, a stand of young growth usually follows if the area is not again burned over. This young growth comes from seed which was stored in the forest floor and which lived through the fire. Should this young stand be destroyed before it reaches seeding age, there would be no further forest growth because of the absence of seed on the area to produce a new stand.

Surface fires kill only occasional mature trees, but they cause much damage to standing



THREE SUCCESSIVE STAGES OF FOREST DESTRUCTION
GOING! GOING! GONE!

Top—Ridges and southern slopes are burned clear of forest growth. Middle—Only scattered trees are left after several fires. Bottom—Hills and slopes are reduced to barren wastes by repeated fires. Note the few trees that are left in the background. All of this is potential forest land on the Crater National Forest in Southern Oregon, which would produce good timber of yellow pine and Douglas fir; but it would have to be replanted, as it will not restore itself.

timber through fire scars. They also kill any young growth in the openings of the forest or on cut-over or burned areas.

In the general practice of logging in the Douglas fir region, all trees are cut. This method leaves the area without seed trees, and when young growth is destroyed there is no provision for its replacement. A large part of the young growth on cut-over areas has come from seed that was stored in the forest floor. Such reproduction can occur only on areas where all fires have been kept out after logging or where only one slash fire occurred soon after logging and at a time when the forest floor was moist enough to protect some of the seed stored in the duff or soil.

Repeated burning ultimately produces barren areas. Such areas are not only non-productive; they are a positive menace to communities in mountain valleys. Muddy water and floods are caused, and even the water supply itself is endangered.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

SAYBROOK, CONN.

By Old Saybrook Town Improvement Association: Harry G. Faulk.

WASHINGTON, D. C.

By Children of American Revolution; National Society Children of American Revolution. By Human Education Society: 3 trees planted for "Remember the Animals and Birds that Fell."

TAMPA, FLA.

By Tampa Rotary Club: James Adams, Donald Ansley, Norman Badger, Reuben Baker, Fred. C. Banta, Earl Clark Bell, Lieut. George Berriman, Algy K. Bivens, Arthur A. Bivens, John D. Barker, Leonard Bozeman, W. R. Bozeman, Jack L. Brantley, Leo Brazil, John F. Bryan, Ramon Cabrera, H. A. Carmichael, Henry B. P. Clayton, Percy F. Cox, Coke P. Coleman, Walter R. Connell, Sgt. Chas. B. Copp, R. E. Cordova, Eric Culbreath, Elder Davis, Olin D. Youngblood, J. G. Darnou, Cecil Emerson, Preston Fields, Del Finley, Maurice Fonseca, Britton Francis, Chas. E. Galvin, John M. Garcia, Robert L. Bradley, Douglas Gammon, David D. Gee, Tod F. Gillett, Marcello Gonzales, Donald Griffin, Vincenzo Guerriero, Chester Hanks, J. W. Hatton, Lieut. Thos. H. Hill, Will Holland, Percy Hurn, Edmund Jochumsen, Freddie Johns, Andrew Jones, Arthur St. Clair Jones, Jack Jones, J. G. W. Kirkland, Willie Kitts, Louis Leeks, E. D. Legree, Armando Leon, Lytle Louden, Joseph A. Lowe, Fred Mansfield, Percy Mansfield, Norman E. McLeod, Angus McLean, Allen L. McMenomy, Chas. W. Middleton, Sam Middleton, Lorenzo Moody, John G. Nelson, Robt. L. Norwood, J. D. Nix, Millard L. Owens, A. J .Pederson, Charles D. Peoples, Clarence Perkins, Marion L. Perritt, Louis Pumorega, J. F. Quisenberry, R. G. Robertson, Emmett L. Simmons, Clarence Slater, Homer Sumner, Wamboldt Sumner, Cyrus S. Taylor, William S. Taylor, Stanley Tillis, Louis Torres, Rufus M. Tounsley, Fred. E. Turner, Louis Vaughan, Harold D. Walker, Stephen B. Ward, Luther Wells, Patrick White, Leo F. Wiggins, Charles S. Wilson, Napoleon B. Wilson, Herbert C. Wooton, Cora Davis.

INDIANAPOLIS, IND.

By Indianapolis Orphan's Asylum: Theodore Roosevelt, William Warner, Curtis Simmons.

WASHINGTON, IND.

By Washington Rotary Club: Jefferson V. Vincent.

FORT MADISON, IOWA

By Ida Mansfield Circle, The King's Daughters: Theodore Roosevelt, Rev. Harry Deiman, Hartman Dawson, Lester Harter, Vincent Hunt, Bernard Pollpeter, Theodore Kokjohn, Harry Vincent, Miles Ramborger, Lawrence Duckworth, Alois Pollpeter, Dorothy Koellner. By Hope Circle, Presbyterian Church: Rev. Harry Deiman, Hartman Dawson, Lester Harter.

GRAFTON, MASS.

By Old Oak Chapter, D. A. R.: Earle B. Stowell, George J. Geleneau, Albert M. Usher, Louis J. Hitchings, Franklin S. Clark.

GROTON, MASS.

By Groton Woman's Club: Sgt. Laurence W. Gay, Seaman Charles P. McHean, Carl B. Gleason, Lieut. John W. Bradley, Clarence Curtis, William C. B. Gilson.

BUHL, MINN.

By Board of Education: Howard Bennett, James Doherty, Cornelius B. Goodspeed, Fred. M. Goodspeed, Arthur C. Williams.

HARRISON, N. J.

By Employees Service Committee, Edison Lamp Works: Colonel Theodore Roosevelt, Leo Sharwell.

VALOIS, N. Y.

By Valois School: William Earle Sutphen, William Coon, Ray C. Gunderman.

BALFOUR, N. DAK.

By Progressive Civic League: Emil Sigfrid Olson, Olaf Edward Myhre, Ulrik Garlie, Jonas August Johnson, Gustav Adolph Stenerson, Louis C. Knuth.

LANCASTER, PA.

By Donegal Society: Lieut. Alexander Rodgers, Jr., Lieut. Daniel Schenck Keller, Lieut. Benjamin Hiestand.

COLUMBIA, TENN.

By Business Women's Association: Henry Hill, Harry Thompson, Isiah Abernathy, Corp. Jim Granberry, James Satterfield, Harry P. Davis, Ed. Walker, Will Houston, Isaac Tom Watkins, James Ewing, Richard Wainright, Jesse J. Thompson, Jim Abernathy.

COLLEGE STATION, TEXAS

By Agricultural and Mechanical College: Elmer Curtis Allison, Farris Shelton Anderson, Clifton Barfield, Walter Gustavos Bevill, William Fowler Bourland, Thomas Reed Brailsford, Vories P. Brown, Jr., Richard Platt Bull, Jr., Joseph Daniel Carter, Romeo Willis Cox, Samuel Reid Craig, Norman C. Crocker, Edward Bishop Crook, M. F. Curtis, Jesse L. Easterwood, J. G. Ellis, Jr., James Ronald Findlater, Benjamin H. Gardner, Jr., Eric Albert Goldbeck, Edwin Mobley Gorman, Cyrus Earle Graham, James Francis Greer, George Little Harrison, Hamlet Park Jones, Charles Hausser, Walter Sherman Keeling, Luke Witt Loftus, Graham Danuel Luhn, Willford McFadden, John Clyde McKimmey, John Lamar Matthews, Hadyn Potter Myers, John Hartwell Moore, John Bolanz Murphy, Robert Walker Noble, Herbert N. Peters, Harry Lamar Peyton, Wendall Francis Prime, Ferdinand Regenbrecht, Edmund Laritz Riesner, Charles Edward Rust, Frank William Slaton, Charles Leroy Teague, William George Thomas, John Percy Thompson, George Francis Wellage, Coney Uncas Woodman, Richard P. Wooley, Benjamin Fiske Wright, Horace Conrad Yates, John Herbert Burford, L. S. R. Suber, James Munroe Woodson.

BOLIVAR, W. VA.

By Caleb Bible Class, M. E. Sunday School: 3 trees planted "To Our Patriots."

WHEN MEMORIAL TREES ARE PLANTED PLEASE INFORM THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.

FORESTS AS A FARM CROP

BY E. T. MEREDITH, SECRETARY OF AGRICULTURE

(Written for American Forestry Magazine)

A LARGER portion of the farm area of the United States is devoted to wood than to any other crop. The total area of woodland on farms, according to the 1910 census, was double the acreage of corn, nearly three times that of hay and forage, four times of wheat ,and six times that of cotton. There was as much farm land in woods as in all cereal crops combined.

In New Hampshire and Vermont, the forest products of farms were second only to hay and forage in total value; in Maine they stood third, exceeded only by hay and forage and potatoes, while in Alabama, Arkansas, Georgia, Mississippi, and South Carolina they also held third place, following corn and cotton. The value of timber products from farm woodlands for the entire United States was more than $195,000,000.

Yet, in spite of the enormous area of farm woods and the value of their product, this branch of farming has, in practically the whole country, received less attention than any other. Few farmers nowadays would expect to make a profit from their wheat, corn, hay or cotton fields, or from their orchards, without giving them a great deal of care and attention. They certainly do not attempt to raise these crops merely by harvesting what chances to grow wild, with no preparation of the soil, no fertilizer, no selection of varieties, no cultivation or weeding, no protection against fires, grazing animals, or destructive insects and fungous diseases.

Farm production of timber should be much greater than it now is, not only because of the benefit to the farmers, who by better use of their wood-growing land might increase their income, but also because of the benefit to the public generally, which, with good reason, is becoming deeply concerned over the question of waning timber supplies.

But this is the way most farm woodlands have been treated. The total value of woodland products, $195,000,000, seems large, to be sure, but when it is remembered that this comes from more than 190,000,000 acres of land, the average production per acre is very small. Pasture is, of course, not being taken into consideration here. It is safe to say that, with very little additional outlay, the woodlands now on farms could produce an annual net income from timber products alone several times greater than the present amount.

Farm production of timber should be much greater than it now is, not only because of the benefit to the farmers, who by better use of their wood-growing land might increase their income, but also because of the benefit to the public generally, which, with good reason, is becoming deeply concerned over the question of waning timber supplies. The Department of Agriculture has an obligation to the country in the whole matter of forestry. Our public forests can not begin to supply our needs. Private forest lands, other than the farm woodlands, are being cut over destructively. Those owned by farmers are as a rule neglected. We can no more do without wood than we could do without iron or coal. It is a necessity of our national life; and it must be grown. The Department of Agriculture would be neglecting an important field of duty were it not to concern itself with the replacement of timber growth on lands naturally best adapted to producing timber, and with the most efficient handling of the lands devoted to this important crop.

The department, through one of its bureaus, the Forest Service, has for years been studying the problems which scientific timber production involve, and can therefore give much helpful advice to farmers as to progressive methods. The Department has also inaugurated a nation-wide movement looking to the general practice of forestry by private owners, so that the forest devastation, which now almost universally attends or follows large-scale lumbering, may be halted.

Most farm woodlands are used to a greater or less extent for pasturing stock. Many woodlots start as open pastures, in which the trees gradually seed in and shade out the forage crop. Others start as dense forests, where the stock and frequent fires, by gradually reducing the density and preventing tree reproduction, eventually destroy the forest or reduce it to open, park-like stands of defective timber which has little commercial value. Too little attention is generally given to maintain the proper balance between grazing use and the production of timber.

If the main object is to raise forage crops, it would be more profitable, as a general rule, to remove most if not all of the tree growth. On the other hand, if the land is chiefly valuable for growing trees, it should not be pastured in such a way as to make impossible the profitable production of timber. One of the most serious abuses to which our farm woodlands are subject is excessive over-grazing, or grazing with the wrong kind of stock, or the annual burning which is often practiced on the theory that it improves grazing. A certain amount of regulated pasturage is in most regions not incompatible with timber production, and indeed may be the means of utilizing a very important by-product of the woodlands, and so add very materially to the revenue derived from them. In some cases properly regulated grazing may even be used as a silvicultural measure to improve the wood crops. Once the individual farmer realizes

the value of the wood crop, if it is rightly handled, understands the conditions which must be maintained to grow good timber, and grasps the nature of the damage which overgrazing does, he can readily work out for himself how to make his woodland best answer his needs.

From the standpoint of timber alone, most farm woodlands as at present handled serve principally for one or both of two main purposes. They afford shelter to crops, buildings, and stock, and they furnish a ready supply of firewood, fence posts, and other low-grade material for farm uses or for sale in nearby communities. Of the $195,000,000 forest crop of 1909, the farms themselves used $103,000,000 worth, and only $92,000,000 worth was sold.

In striking contrast to this figure, the total value of all forest products for the United States was more than a billion dollars, of which approximately three-fourths came from the woodlands owned by lumbermen. Few people realize that farmers own as large an area of forest land as do all the lumbermen and other private owners combined. Yet such is the case. Moreover, the farm forests, in most instances, have a decided advantage over the holdings of other owners, in that they are usually easy of access and are close to a market for the low-grade material that is wasted in most lumbering operations. In fact, this low-grade material, really almost a by-product of the main business of growing timber, is, in a very large proportion of cases, about all that the farm forests now produce.

There is no good reason why our farm forests should produce only firewood and similar low-grade material. They can, and should, produce a very large share of the Nation's railroad ties, telephone and telegraph poles, cooperage material, tanbark and acidwood, veneer logs and even lumber.

This condition is due entirely to neglect and lack of knowledge of woodlot care. With any treatment, or lack of treatment, which stops short of the most ruinous abuse, the farm forest will provide shelter, and also a certain amount of firewood, fencing, and similar material. But it will not be a profitable part of the farm. There is no more reason to feel satisfied with a woodlot which merely fills these needs than there is to be satisfied with wheat which yields only five bushels to the acre, or with orchards which produce only cider apples, and less than half a crop at that.

It is not yet generally understood that forest crops also may be greatly improved, both in volume and quantity, if care is used in handling the woodlots. That this is true has been amply demonstrated not only in other countries, where returns from woodlands are often a very important part of the farm revenues, but also in every part of the United States where a fair trial has been made. On many of the farms in the white pine belt of central New England, saw-timber furnishes the best-paying crop produced. There is no good reason why our farm forest should produce only firewood and similar low-grade material. They can, and should, produce a very large share of the nation's railroad ties, telephone and telegraph poles, cooperage material, tanbark and acidwood, veneer logs, and even of lumber.

When trees are cut from time to time merely to supply farm needs as they arise, with no definite plan or forethought for future needs, the woodlands, of course become run down. If when the farmer wants a few fence posts or his winter's firewood, he selects the trees which will work up most easily or are most convenient to get out, the chances are that he will remove the very trees which ought to be left until they develop into high-grade material. Then later, when perhaps he wants to raise some ready money, instead of a valuable stand of readily salable timber he may find on his woodland a poor growth of trees fit only for firewood. Relatively few farm woodlands are fully stocked, and fewer still are stocked with the kinds of trees that will produce the greatest return. Using these lands to grow poor crops of inferior wood is very much like using good pasture land to support scrub cattle. Certainly, no good farmer would market steadily the best animals from a herd of cows and breed from the poorest.

Recent developments are bringing out much more clearly than ever before the opportunities to make farm woodlands yield a good return. The increasing scarcity of many important and high-priced woods, such as black walnut, black locust, red cedar, ash, hickory, and white oak, is resulting in an intensive combing over of the small holdings in many parts of the country. In some sections, the search for timber for box boards or for pulp is almost as intensive. The extension of good roads and the development of the motor-truck have made it possible, in many instances, for buyers to scour a region and even to pick up single trees, where formerly they could not consider any lots less than a carload. Farmers who have been farsighted enough to maintain their woods in first-class condition are now in a position to begin to reap the benefits, if they have not already done so. Those who have overlooked the possibilities of timber as a money-producing crop should take immediate steps to develop this important source of farm revenue.

More than half of the entire hardwood forest area in the country is on farms, and, with the cutting out and gradual clearing of the larger hardwood tracts, they must, more and more, come to be the main source of supply for many of our most valuable woods. Among these are the oaks, walnut, yellow poplar, hickory, ash, maple, elm, and beech, which are indispensible for many of our most important wood-using industries, such as the manufacture of furniture, vehicles, and farm tools and machinery. Farmers own about one-third of all the

(*Continued on page* 342)

MANAGEMENT OF THE STATE FORESTS OF PENNSYLVANIA

BY JOSEPH S. ILLICK

CHIEF, DIVISION OF SILVICULTURE PENNSYLVANIA DEPARTMENT OF FORESTRY

THE practice of forestry began at an early date in Pennsylvania. In 1681 William Penn, in his Charter of Rights, prescribed a method of perpetuating the forest resources of the State. Ever since this early attempt a few private owners of forest land have managed their properties with care and forethought, but the real advent of rational forest management did not take place until after the State began to acquire forest land. In 1897 the Legislature authorized the State purchase of forest land for the purpose of establishing



STARTING FOR A FOREST FIRE ON THE MONT ALTO STATE FOREST WITH A STATE-OWNED TRUCK

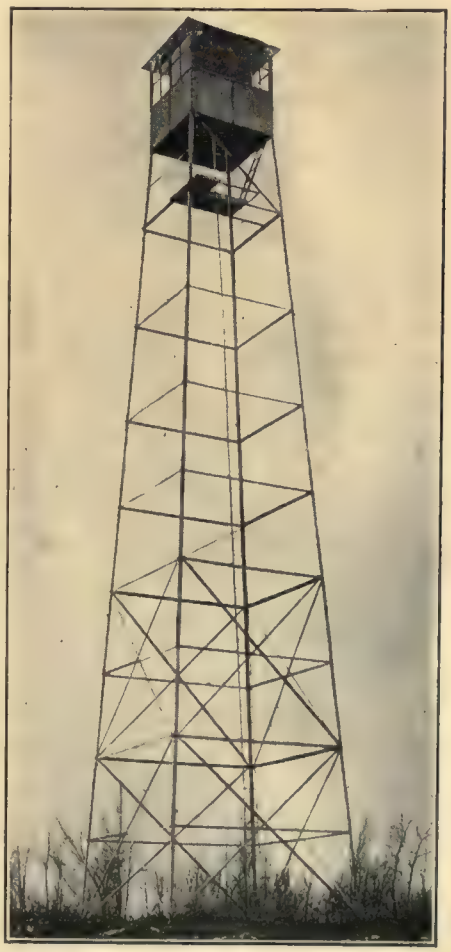
Forest Reserves, now known as State Forests. Since then each Legislature has appropriated money for the acquisition of additional forest land and for the development of that already in possession of the State. To date (January 1, 1920) 1,048,692 acres have been purchased at a total cost of $2,391,943.51, which represents an average price of $2.28 per acre.

The purpose of acquiring forest land for the State was not to *preserve* or *reserve* the products found thereon, but to develop and improve the land to its maximum productive capacity by using methods which are economically recommendable and give sylvicultural satisfaction. Such an objective implies an orderly plan of management, but before such a plan can become operative a number of preparatory procedures must be successfully carried out. Among them are two which may be regarded as prerequisites to the orderly management of any forest property, viz.: (1) The establishment of clear title to all pending acquisitions, and (2) the definite location and accurate delimitations of all purchased areas.

The ownership of a tract of forest land cannot be assumed, but must be established by a thorough examination of all titles. A real business-like acquisition procedure will prevent many a subsequent dispute, or possibly costly litigations. In this field of endeavor the Pennsylvania Department of Forestry has been singularly successful, for in only two instances has title to tracts of State forest land been questioned, and in both cases the court decided in favor of the State. The experience of Pennsylvania foresters in the field of forest land acquisition shows conclusively that a clear title must be established in all instances before acquisition proceedings are completed and before the plans of management are applied.

The second prerequisite implies that a careful and complete boundary survey should be made immediately after the forest land is acquired. This will enable the forester in charge of the land to make a complete and systematic study of the forest growth conditions present upon the area, and on the basis of this study he will be able to prescribe a method of handling it properly. Such a survey and clearing of boundary lines will also prevent adjoining land owners from trespassing intentionally or encroaching innocently upon the state-owned land.

The two foregoing preparatory procedures are very important, but they are of little consequence unless followed up by the three essentials to the orderly handling of a forest property, viz.: *men, money* and *material.* Ever since the purchase of State forest land began in Pennsylvania it was evident to those in charge of the business that every acre of acquired land is in need of recuperative treatment.



ONE OF NINE STEEL FOREST FIRE TOWERS ON THE STATE FORESTS OF PENNSYLVANIA

The condition of the growth on most of the land was extremely unsatisfactory and implied that much constructive work was to be done. In this undertaking, just as in all others, work implies workmen. The nature and newness of the required forestal operations suggested that the men assigned to do the work should be prepared for their responsible positions by a course of training in forestry. For five years after Pennsylvania began purchasing forest land no full course of forestry was offered by any institution within the State, and only three insti-



PRIVATELY OWNED RECREATION CAMP ON THE CLEARFIELD STATE FOREST OF PENNSYLVANIA

Hundreds of camp sites within the State Forests have been leased to clubs and other organizations.

tutions were offering complete courses within the country. This acute situation had to be met, and was met by the Department establishing its own school of forestry at Mont Alto in 1903. The establishment of the school could not be deferred, for trained foresters were urgently needed. Over 100 men have been graduated from this school and were awarded the degree of Bachelor of Forestry. The establishment of the Pennsylvania State Forest Academy was an educational experiment which not only has met the progressive demands of Pennsylvania forestry during the past 17 years but also greatly surpassed the highest hopes of its founder.

The operative methods, now in use on the 53 State forests, with an average area of 20,000 acres each, cannot be considered without mentioning the men from Mont Alto, for they conceived and introduced most of them. A few methods were *adopted* from the practice of foreign countries and some were *adapted* from foreign and neighboring State practice, but the best and most practical methods were worked out anew and are the result of local experiences and scientific experimentation on the State forests of Pennsylvania.

Money may be appropriated and materials may be available for the conduct of the business of a forest property, but these are insignificant essentials in comparison with the men, who are to expend the money and use the material. In order to develop the best operative methods in forestry the foresters must be satisfied. Satisfaction implies plenty of work, comfortable accommodations, and adequate remuneration. There appears to be no lack of work on the State forests, and comfortable accommodations are being supplied to the foresters as rapidly as possible. Many of them live in State-owned houses, equipped with modern conveniences and often supplemented with a garden and barn or garage, and a few of them are supplied with State-owned automobiles. It cannot be said, however, that their salaries are adequate, for the maximum now being paid to a forester in charge of a forest is $1,800.00 per year, and most of them receive only $1,500.00. In consequence of low salaries many of the foresters are seeking more lucrative positions, and in many instances their financial gain is great, but in almost all cases the loss to the State is even greater.

The main lines of work conducted by the foresters during the past decade comprise the disseminating of forestry information to the public, the protection of forests from fire, the planting of forest trees, the building of permanent forest roads, the utilization of forest products and the investigation of forest problems. The foresters have been engaged in many other minor lines of activities, but the foregoing embrace most of the major developmental operations.

Forestry cannot maintain itself or progress without the aid of favorable public sentiment. It is needed in all phases of the work. Many technical appliances have been designed by the Pennsylvania foresters to fight forest fires, and most of them have been extremely helpful in controlling the worst foe of the forest, but the best method of combating this ubiquitous curse of the forest is the development of a public sentiment which not only tolerates the protection of all forest land but urges its extension and promotion. Public sentiment in Pennsylvania favors the protection of the forest in the best form



REMOVING FUELWOOD FROM A STATE FOREST

The removal of dead and damaged material improves the composition of stands, and makes the forest more attractive and sanitary. The local fuelwood haulers pay 25 cents per load for the wood as they find it in the forest. On the Mont Alto State Forest approximately $500 is realized annually from the sale of this kind of material.

and to the fullest extent. However, it cannot operate alone, but must be supplemented with material and supplied with adequate funds. The material equipment now present upon the State forests, consisting of 9 steel observation towers and more than 125 wooden and tree towers, many miles of usable roads, lanes and trails, an extensive network of telephone lines and much other essential material, does not comprise all that is desired, nor is the present available appropriation of $50,000 per year for the handling of forest fires in all parts of the State adequate, yet the effect of a favorable public sentiment supporting forestry and the co-operation of the



THE HOME OF A PENNSYLVANIA FOREST RANGER

The home is owned by the State and located on a high plateau within a State Forest and near an excellent observation point.

public in the prevention and extinction of forest fires is reflected in the following table, which shows the improvement in the forest fire situation on State-owned land during the past seven years:

Year.	Area of State Forest Land Burned (Acres).	Percentage of Total Area Burned.
1913	80,154.00	8.06%
1914	19,412.25	1.94
1915	36,689.00	3.65
1916	23,318.75	2.30
1917	14,441.90	1.42
1918	16,600.16	1.61
1919	13,298.25	1.27

If forest fires are kept out of the forests, nature will in most places reclothe the soil with a woody growth. Nature's methods, however, are slow and uncertain and the resulting stands are often unsatisfactory in condition and inferior in composition. Consequently, it soon became evident everywhere in the handling of the State forests that nature's results require supplementing by planting valuable young forest trees.

Planting has been in progress on the State Forests since 1899, and to date (January 1, 1920)



A STATE FOREST ROAD AND TELEPHONE LINE

Both were constructed and are being maintained by the Pennsylvania Department of Forestry.

over 33,000,000 trees have been set out. While most of the planting was experimental and comprised exotic as well as native species, yet about 75 per cent of the trees set out are still living, and most of these are making satisfactory growth. The planting of so large a number of trees required an expenditure of $204,425.93, which amount may seem large, but a careful study of the total expenditures of the Department of Forestry will show that only 3½ per cent was used in reforestation work. Such an expenditure is surely permissible, for in the normally stocked and intensively managed forests of Bavaria an allotment of 9 to 10 per cent of the total expenditure is made for reforestation. Inadequately and improperly stocked stands must be built up and improved. Protection alone will not do this work satisfactorily. A balanced development of a forest business is needed, which implies adequate protection, some planting, much natural regeneration and considerable improve-



A PENNSYLVANIA FORESTER'S HOME AND HEADQUARTERS

The house is owned by the State and located within the State Forest, in charge of the forester.

ments, which include roads, telephone lines and trails. The plantations on the State Forests of Pennsylvania have won more recruits to the cause of forestry than any other single line of forestal endeavor. They are the property of the State, with the citizens voluntarily serving as custodians. For 20 years trees have been planted on the State forests, and yet in spite of the large acreage reforestated only six-tenths of one per cent of the total planted area was burnt-over — that is, three-one-hundredths of one per cent annually. This creditable accomplishment indicates that the protection afforded them was good, and that planting on the State forests is reasonably safe.



THE LARGEST BUILDING IN THE FOREST ACADEMY GROUP

More than 1,500 miles of old roads have been improved, and approximately 3,000 miles of new roads, trails and lanes have been constructed. This development made possible better protection of the area and opened up for recreation and utilization remote regions containing large quantities of valuable forest commodities.

The products of the State forests are being utilized as rapidly as funds become available for carrying on the operations. Much hypermature material has been removed and marketed. The removal of dead, dying and damaged material is going on continuously, with the result that the composition of the treated stands is being improved and considerable revenue is realized. The following tabulation contains the amount of revenue derived annually since 1900 from the sale of forest products:

Year.	Amount.
1900	$1,227.87
1901	1,951.57
1902	1,578.70
1903	9,758.02
1904	1,373.94
1905	2,247.67
1906	5,001.24
1907	3,955.89
1908	2,473.76
1909	5,267.11
1910	9,176.09
1911	6,460.08
1912	12,585.67
1913	13,076.07
1914	15,066.64
1915	13,483.84
1916	21,459.97
1917	21,569.69
1918	24,410.24
1919	34,517.15
Total	$206,641.21

This statement shows how the income from the State forests has been increasing, and it is safe to predict that the achievements of the past are but a prelude to the real financial accomplishments of the future, when the young stands of forest trees which are now being established so carefully and developed so safely and in accordance with the principles of scientific forestry will have reached merchantable size and increased in value sufficiently to recommend their marketing.

FORESTS AS A FARM CROP

(*Continued from Page 338*)

softwood forest lands from which must come the lumber used for construction of buildings, cars, and other structures, and most of the pulpwood used for the manufacture of paper.

While, of course, part of the increase in lumber prices is due to the conditions that have brought about the general rise in the price level of all materials, part of it is due to the failure to keep productive the forest lands in the older settled parts of the country. Much can be done by the farmers themselves, through careful handling of their own woodlands, to protect the country against the consequences of the present methods of the lumber industry and keep at a reasonable level the costs of lumber and other forest products used by farmers.

The benefits of forestry are very real benefits. While wise use of up-to-date methods of growing timber on the part of farmers generally would mean a material increase in the value to them of their farms, it would also contribute very materially to the national welfare. It would mean not only greater production of wealth, but also of lcoal supplies of material necessary for many industries. It cannot be emphasized too often that the country must have forests, widely distributed and abundant. It will not do for us to depend entirely on supplies that are thousands of miles away from the consumer.

By learning and applying the principles of forestry, as a part of intelligent agriculture, our farmers will make their forest property serve the national welfare at the same time as their own.

WHITE PINE "FLU"

BY JOHN N. WASHBURNE

"THIS is the first time I've seen your face in three years," I told Posey after I had glanced around his new office which the University of California had placed at his disposal in the Agricultural Building.

"You saw me last fall, didn't you?" Posey replied.

"Not your face. You had a 'flu' mask on at that time."

"So I did," he nodded seriously, "and do you know what this office is?—these cards and files and papers and specimens? It is the 'flu' mask of the Western white pine tree. There is an epidemic now rampant among the Eastern white pines, a blight gradually creeping westward, which is more fatal to the five-needled pine trees than was the Spanish influenza to the human species. For the White Pine Blister Rust—that is the name of the plague—is incurable once it gets a hold on a pine tree.

I thought of the California sugar pine—that finest timber tree in the world—and realized that it also was a five-needled pine. When I manifested my interest in the subject, Posey, who is officially known as Gilbert B. Posey, of the Office of Blister Rust Control, Bureau of Plant Industry, Department of Agriculture, Washington, took me over the office and explained some of the intricate and thoroughgoing work which he is doing for the Government.

The office has been made the headquarters for the Blister Rust Control work of 12 Western States. From it scouts are sent out all over the vast Western territory to look for the first signs of the encroaching menace. There are 3,000 linear inches of cards, each card bearing detailed information of the whereabouts of all white pine trees, gooseberry or currant bushes which have been shipped into California, Washington, Oregon, etc., in the last 20 years. The gooseberry and currant plants, Posey explained, carry the disease. In fact, the growth (for Blister Rust is a parasitic fungus) spends half of its life on a gooseberry or currant plant, and wherever these bushes (called Ribes) are exterminated the epidemic is at an end.

"I am going out on a scouting trip myself in a few days," Posey remarked. "A Mrs. Clemens, of the Sierra Club, reports signs of the plague down in the Yosemite. How would you like to come along?" I snapped up this proposition eagerly and made arrangements to meet him the following Tuesday.

Nothing of interest occurred until our second day in the Yosemite. The first day we spent crawling about among some of the 60 varieties of wild currants and gooseberries that grow in California and looking on the under side of their leaves. But no sign of *Cronatium ribicola*, which is the scientific name for White Pine Blister Rust, could be found. At first I mistook every yellow-tinted speck for a symptom of the Rust and could scarcely tell a gooseberry bush from a Bull Thistle, but under Posey's coaching I soon began to make myself useful—at least, so I believed. That evening, and many subsequent evenings, we spent our entire time picking prickles from our hands.



CULTIVATED RIBES. TOBY'S PLACE. KITTERY POINT, MAINE

About twice natural size. Native white pine tree 12 years old, 6 feet tall, 2½ inches diameter at base. Showing top portion of 14-inch girdle extending from ground up.

The morning of the second day we made an early start for Snow Creek. Although statistics say that Snow Creek has an elevation of only 6,500 feet, it is difficult to believe. For the pass leading there is five miles long and is nearly perpendicular. All along the way we came across the two predominant species of Ribes—the flowering currant and prickly gooseberry. I grew to know them at sight, and took particular delight in discovering and pointing out to Posey those plants growing at the top of some slippery rock or steep, soft bank of earth. By the time we reached Snow Creek in the early afternoon Posey had done so much climbing that he sank down exhaustedly in the place we chose for our luncheon, without even glancing at the nearby gooseberry bushes.

"We'll inspect this place after chow," he said, opening the bundle of lunch which, was pathetically small in comparison with our appetites. While we made the best of the little we had, I asked Posey a few more questions concerning this enemy of plant life against which we were campaigning.

"As nearly as can be discovered," he answered my questions, "the blight originated in Siberia, spread

through Europe, and was brought to this country on imported nursery stock. Of course, now there is a strict quarantine against practically all imported plants, including all foreign Ribes and five-needled pines. Before it was realized it had hopelessly invaded the New England States and had gained a foothold in the Great Lakes region. Before we could check it, it spread West through Minnesota and even into the eastern part of North Dakota. But we stopped it there, and are now holding it



TYPICAL FATAL INFECTION

Side branch of native white pine, 15 years old, 7 feet tall, 3½ inches diameter at base. Side branch became infected from long infection on main stem which had girdled and killed main stem above. Branch 10 years old.

in check by strict precautions. Of course, it may have already invaded this country out here before we took the work in hand. If so, I do not know what can be done; you can see for yourself how impossible it would be to destroy all the currants and gooseberries in many parts of this country. I'm afraid if we find any of the Blister Rust out here the great Western white pine and sugar pines of California will suffer severely."

"See how thickly these things grow," he remarked, indicating a gooseberry bush not two feet away. Casually he snipped off a branch and glanced at the under side of the leaves. His eyes fastened themselves on the object in his hand.

"By God!" he exclaimed, "I believe this is it!"

He sprang up and began searching about. "Here's more of it!" he cried from a little distance. "Yes, and here's still more. There's quite a lot of it around here."

"Well," I asked when he returned, "does that mean that the pines of the West are threatened?"

"There is one hope. It may be the Pinon Pine Rust, which is harmless to white pines and in appearance is very similar to the true White Pine Blister Rust during the stage in which it is growing on the Ribes."

"Why not be optimistic then?" I advised.

"Because of the possibilities. Look about you. There are only sugar pines here. I do not believe there is a Pinon pine in 50 miles."

"I will have to go further with this thing than I had planned," he said presently. "When we get back to Camp Yosemite I will get in touch with a few of the men who are working with me and organize a camping tour to inspect all this country. Do you want to stick with us?"

I looked at my thorn-filled hands and thought of the small luncheon we had had. "I'll think it over," I replied.

But that night, at Tenaya Lodge, after I had ordered and eaten two complete dinners and was lying deliciously



SIDE BRANCH INFECTION

Small side branch of 15-year-old white pine at Kittery Point, Maine; 14 feet tall, 4 inches diameter at base. Fruiting on 4-year-old internode.

stretched out on my bed, I looked long out of the window. The pines drew solemn shadows in the silver of the moon. Their hushed, green fragrance lay upon the susurrous breeze. Their voice was in the room; and I felt their strength and knew the huge and quiet joy of their existence. All the beautiful night, from the leaves decaying on the ground to the breath of the sky, carressed and sustained these ancient, peaceful lives. They stood in serene and magnificent oblivion of their impending disaster. But *I* knew their danger, and knew that I could not go back to the city while the question of

whether they would be saved or would perish remained unanswered.

Ten days later we went to Merced, there to meet the men for whom Posey had telegraphed. When we arrived the supplies had been bought and everything was ready for the undertaking.

Harland R. Wilson, from Los Angeles, was there with his big seven-passenger car, which he had rigged out to be the ridge-pole as well as one of the walls of our tent—an ingenious contraption of his own which made camp pitching an easy matter. Wilson is a big, raw-boned, powerful man of about 45, ex-sheriff, ex-constable, ex-star football and baseball player, bronco-buster, botanist, woodsman and father of six children. Mrs. Wilson, genial and active, came along to cook the meals.

There was also Prof. A. O. Garrett, from Utah, a placid, elderly man with an encyclopedic mind and a vast knowledge of all plants. The fourth member of the party, who was so lively he might be counted as two members, was Henry N. Putnam, from Michigan, little, energetic, keen-eyed, and humorous, in love with the woods and with his work, a veritable ferret in the matter of finding whatever he sought.

At Wowona we found the same rust on the under side of the Ribes, and again at Mariposa. From there on an inspection was made every mile, and at each stop were found signs of the disease. Daily specimens were mailed to Washington for expert analysis, and as we continued our journey and found how wide-spread the disease had become we dreaded more and more the decision—the definite determination whether it was the harmless Pinon Pine Rust or the dreadful White Pine Blister Rust.

From the Yosemite we traveled over the Tioga road to Mono Lake and thence toward Lake Tahoe. All the way we found the rust, but none of the sugar or white pines betrayed symptoms of the disease. We crawled out along their branches, looking for the tiny fungus which feeds upon and blisters the bark, encircling the trunk like a felon, choking the life of the tree, and sometimes causing it to swell hideously as if suffering from some fantastic elephantiasis. But only the currants and gooseberries showed signs of the rust.

Finally, near Bridgeport, one early morning when Putnam was away looking for firewood with which to cook our breakfast, we heard a distant shout and went to investigate. After much "halooing" we came upon a great Pinon pine and on one of its branches was Putnam.

"I've found it," he shouted. "Here it is—thick! It's the Pinon Rust, all right, I'll bet 10 to 1."

We looked about and found that every currant and gooseberry plant within a radius of several miles was covered with the rust. And during that day as we drew farther away from the group of Pinon pines the rust on the Ribes became scarcer.

"I think it is conclusive," said the Professor, "the farther the wind has had to carry the spores the thinner the rust becomes on the Ribes. It is very encouraging, anyway."

Indeed, it was so encouraging that Posey and I returned to San Francisco that night while the others continued their campaign.

The next morning I telephoned Posey in his office.

"Have you heard from Washington?" I asked.

"I have," he answered, "and I have telegraphed the news to the Professor and Wilson and Putnam. The Department of Agriculture writes that all the specimens they have received have been Pinon Pine Rust."

"Put 'er there, old man!" I cried, forgetting that I was in San Francisco and he was in Berkeley.



HOW A BUILDER RESPECTED A TREE

By Helen Harrison

IT is not always necessary to sacrifice full-grown trees when business blocks begin to crowd out residential sections. The owner of this property built around the half-century-old elm tree, rather than fell it, a fate that met hundreds of similar trees in Bridgeport, Connecticut, when one of the principal streets was widened. The space taken up by this tree has been well camouflaged inside the building by a shallow cupboard effect. Who knows but the lines "Woodman, spare that tree," learned at the old brick schoolhouse, may have been the influence at work when the owner, the late George C. Edwards, formerly president of the International Silver Company, gave instructions to his architect to build around this tree.



THE DISTRICT OF COLUMBIA CELEBRATES ARBOR DAY *National Photo.*

The first Arbor Day the District of Columbia ever observed officially was on April 16, the day having been set apart by proclamation of the Commissioners. Tree planting across the drive from the Lincoln Memorial was the District's part in the days plan. Secretary of Agriculture Meredith shown here speaking was the orator. Each public school class was represented by a pupil, and this delegation is shown in front of the speaker's stand. Clifford I. Lanham, the superintendent of trees and parking, had charge of the ceremony, and the first tree was planted in memory of his father, who for 25 years held the position the superintendent now has.



MEMORIAL TREE TO ANIMALS AND BIRDS *National Photo.*

The first tree planted in memory of the birds and animals killed in the war to be registered on the honor roll of the American Forestry Association was placed at Happy Hollow playgrounds, Washington, D. C. Children gave the program of the American Forestry Association for tree planting. James P. Briggs of the Humane Education Society made an address and the tree was marked with the bronze marker designed by the Association. The tree planting was the big feature of "Be Kind to Animals" Week.

LIVING MEMORIALS

THE District of Columbia had its first official Arbor Day on April 16. It was ordered by the Commission in a formal proclamation. The day was widely observed. Clifford I. Lanham, superintendent of trees and parking, provided a fine program with the planting of trees along streets, the first of which was a tree in memory of his father who for 25 years held the position of the District of Columbia in memory of the animals in the war. One of these trees was at the Happy Hollow Playgrounds. The ceremony at Happy Hollow was unique indeed. Children bearing large letters that spelled "Be Kind to Animals" accompanied by Girl Scout Troop No. 1, marched to the spot where the tree was placed. The program of the American Forestry Association for



THE PIN OAK FROM MOUNT VERNON PLANTED BY THE NATIONAL SOCIETY OF THE CHILDREN OF THE AMERICAN REVOLUTION

Mrs. Daniel C. Lothrop, who founded the National Society of the Children of the American Revolution 25 years ago, turned over to Mrs. Frank Mondell, the newly elected president, the memorial tree planted by the society and registered on the National Honor Roll of the American Forestry Association. Mrs. Lothrop is shown with the bouquet of flowers and Mrs. Mondell, the wife of the Representative of Wyoming, is holding the marker. The other national officers in the picture are Mrs. Horace M. Towner, wife of Representative Towner of Iowa, Mrs. Percy M. Bailey, Mrs. G. M. Brumbaugh, Miss Grace Pierce, and Miss H. E. Stout. The sessions of the National Society of the Children of the American Revolution were held co-incident with those of the sessions of the Daughters of the American Revolution in Washington. The tree is a pin oak from Mount Vernon.

his son now holds. Secretary of Agriculture Meredith was the speaker of the day. A delegation of school children, an appointee from each class, was present at the ceremonies. Commissioner Brownlow introduced the speakers, who were Secretary Meredith and General William Mitchell of the United States Air Service.

As one of the features of "Be Kind To Animals" Week, which date coincided with Arbor Week, memorial trees were planted by the Humane Educational Society tree planting was carried out by the children. Mrs. Ira Bennett was chairman of the committee of arrangements. The National Society of the Children of the American Revolution planted a memorial tree on the grounds of Continental Memorial Hall during the sessions of the Daughters of the American Revolution. Another tree was planted on the grounds of the Marine Hospital in memory of Charles A. Rhett Jacobs of the Marines who was killed in action in France. On May 4 the District Federation of

Women's Clubs planted a tree in memory of J. Sterling Morton, the father of Arbor Day in the United States.

At the bi-enniel convention of the General Federation of Women's Clubs in Des Moines in June the conservation department under the direction of Mrs. Mary K. Sherman, gave a big part of its program to memorial tree planting and making of plans for a nation-wide campaign for encouraging it.

The planting of fifty-three live oak trees as living monuments to the sons of A. and M. College of Texas who died in the service of their country in their efforts to perpetuate the liberty that had been their heritage, was the occasion of a simple, but most impressive ceremony. Several hundred cadets assembled in front of Guion Hall. President Bizzell, five members of the Board of Directors, President L. J. Hart, W. A. Miller, Jr., John T. Dickson, J. R. Kubena and H. A. Breiham, together with a number of faculty members, were grouped on the steps of the building. Dr. John A. Held, pastor of the First Baptist Church of Bryan, invoked the blessings of the Almighty on the crowd assembled. The College Band played the English Anthem, "God Save the King." President Bizzell then introduced the speaker of the day, L. J. Hart, of San Antonio, President of the Board of Directors. At the close of his address Professor R. F. Smith read the names of fifty-three men, members of the Federal and College students, Alumni and faculty, who were each placed in charge of a squad of four cadets to plant a tree for one of the heroes. As the band played the French National anthem, "Marseillaise," the squads under their leaders marched to a tree planting site, and as the notes of the American anthem were played the earth was placed around the roots of the trees. When the work was finished taps was sounded. And immediately following came the "Star Spangled Banner," bringing the crowd to attention. When the last note was sounded the meeting was dismissed.

Following the calling of the roll President Bizzell announced that at the meeting of the Board earlier in the day it had been decided to plant one tree in honor of A. B. Davidson, former Vice-President of the Board, who died recently, so immediately following these exercises President Bizzell took the five members of the Board to a place near the entrance to the College grounds and there planted one live oak tree in memory of this distinguished citizen of Texas.

Mrs. Blanche Bellak of Philadelphia and Washington is setting a fine example to war mothers by her planting of memorial trees for her son, Joseph Faussett Bellak, U. S. N. Mrs. Bellack is taking a keen interest in all affairs of the American Legion and the Patriotic Order of the Sons of America and has been of great help to the organization of the Joseph Faussett Bellak Post No. 195 of the American Legion in Philadelphia. Mrs. Bellak planted a gold star tree in the south side of the churchyard of historic Christ Church, Second Street, above Market, in Philadelphia, in memory of her son, Lieutenant Bellak, the only member of the congregation of that church to lose his life in the war. The tree, an English elm, is a gift to the church by Mrs. Bellak, who had it brought from Oxford, England. The Joseph Faussett Bellak Post No. 195, of the American Legion, attended the service in a body, as did the Patriotic Order of the Sons of America. The post is composed of men who served in the Navy during the war. The dedication was by Dr. Louis C. Washburn, rector of Christ Church. Chaplain Curtis H. Dickens, of the Navy Yard, made a brief address. The dedication ceremonies followed a memorial service in the church in honor of the 139th anniversary of the inauguration of George Washington



Photograph by Rau

THE "GOLD STAR" PLANTING AT HISTORIC CHRIST CHURCH

This English elm was planted by his mother, in honor of the memory of Lieut. Bellak, U. S. N., following an impressive memorial service at old Christ Church in Philadelphia. The gold star for Lieut. Bellak is the only one on the bronze memorial tablet of this famous old church.

as President of the United States. It also marked the 225th anniversary of the church.

The forestry committee of the Civic League of Texarkana, Texas, of which Mrs. C. S. Hutchins is the chairman, planned a ceremony for honoring the memory of John C. Watts, the first Texarkana boy to die in France. Every member of the Watts family resident in Bowie County placed a little earth brought from the home place, around the tree. Superintendent George H. Carpenter dedicated the tree and Judge R. B. Levy delivered the memorial address. The students formed in a semicircle around the tree, while a representative of each class deposited a portion of the dirt. Mrs. Hutchins read the honor roll and placed a few violets in the earth.

The most widely observed Arbor Day in the history of Maryland was that of this year. Through the keen interest of the Park Board and the School Board of Baltimore, approximately 80,000 public school scholars went to the public parks and assisted in planting trees. One hundred and fifty-eight schools had part in the work. Superintendent Koch, of the city schools, provided that pupils reassemble, as always, at 1.30 P. M. at their respective schools and go to the planting places. There were addresses to the school pupils by members of the Park Board in the parks and surrounding squares. J. Cookman Boyd, president of the Board, spoke in the Druid Hill Park district; General Felix Agnus, in Clifton Park and nearby squares; Edward Hanlon, in the Hanlon and Gwynns Falls Park district, and Theodore Mottu, in the Carroll Park district and J. Harry Gross, former engineer, to the Park Board.

At Middletown, Delaware, tree planting exercises were held on the high school campus. Mrs. H. B. McDowell, chairman, had charge. The children sang "The Planting Song," which was followed by an address by Superintendent Wilbur H. Jump. The poem, "Trees," written by Joyce Kilmer, who died in France, was recited by one of the children, and "What the Trees Teach Us," by fourteen children. The Rev. F. H. Moore dedicated the three trees with appropriate remarks; the linden, to J. J. Hoffecker, Jr., of Company B, 9th Infantry, who was killed in battle near Soissons; the maple, to Rupert M. Burstan, of the marines, who died of pneumonia six weeks after reaching France; the catalpa, to David Manlove, who fought in several battles, went over the top safely—then, after the armistice was signed, was killed by an exploding shell while engaged in reconstruction work. At the conclusion of the exercises, Dr. Moore and a



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MEMORIAL TREE IN HONOR OF BRITISH SOLDIERS

Memorial trees are being planted in Great Britain. The planting of which this is a photograph was at Manchester, England, where the Lord Mayor, Tom Fox, is placing a tree in memory of the boys of the Blackley Municipal Schools who gave their lives to their country in the Great War.



MEMORIAL TREE PLANTING BY THE TEXAS HIGH SCHOOL AT TEXARKANA, TEXAS

Memorial tree planting by the Texas High School at Texarkana, Texas, was done in honor of John C. Watts, the first Texarkana soldier to die in France. Every member of the Watts family living in Bowie County placed a little earth brought from each member's home around the tree.

number of the ladies went to the negro school where a maple was planted, dedicated to the memory of Jeremiah Jackson, the only negro boy from Middletown who died in the service. The Rev. M. Parker, pastor of the Browntown Church, made the address.

A linden tree was planted on the campus of the Woman's College at Newark, Delaware, by members of the Waverly Club of Hockessin, in memory of the heroes of the world war. Miss Sara Eastburn, president of the club, headed the work and was assisted by Miss Dora Wilcox, of the faculty; Miss Ruth Messick, president of the senior class; Miss Marie La-Gates, president of the junior class; Miss Elizabeth Taylor, president of the sophomore class, and Miss Rachel Kegerreis, president of the freshman class. The Gordon Heights Community Club observed Arbor Day by planting trees on the community ground. Four trees were planted in honor of four of Delaware's sons who gave their lives in the war. The trees were dedicated to the memory of Louis Thorpe, Watson Lenderman, Thomas W. Eaton and Edgar Chalfonte.

In thousands of communities along the Lincoln Highway trees were planted. At many of the services, the trees were dedicated with appropriate exercises to the men who gave their lives in the World War. Perhaps the one organization most interesting in the beautifying of the Lincoln Highway is the General Federation of Women's Clubs of America, and many club members participated in the exercises.



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GOVERNOR EDWARDS PLANTING A TREE

At Trenton, New Jersey, the Governor of the State planted a tree on Arbor Day in memory of the soldiers of the State who died in the Great War.



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FOR NEW JERSEY DEAD

Attorney James Hammond planting a tree on the Brunswick, New Jersey, Pike, in honor of the soldier dead of New Jersey. The ceremony was held on Arbor Day.

At Bordentown, New Jersey, the Bordentown Military Institute placed twenty-two trees in memory of the Institute's boys who gave their lives in the World War. Colonel Thomas D. Landon, the commandant, arranged the program which included an address by Judge H. B. Wells. Maxwell Emerson, a nephew of D. Edgar Maxwell for whom one of the trees was planted, gave a recitation and the public school pupils rendered "What the Trees Teach Us." Rev. James Burns offered the prayer and the tree song from the American Forestry Association's program were sung. All of the 22 names have been registered on the national honor roll.

Tree planting activities have really but begun. The living memorial is appropriate to any and all memorial plans whether it be the single tree or a "Road of Remembrance." The "Road of Remembrance" idea has been taken up most heartily. The Association's suggestion that the Bankhead Highway be made a "Road of Remembrance in honor of the late Senator John H. Bankhead has received the most welcome editorial comment throughout the South.

A great Liberty Memorial Park was proposed by the Daughters of the American Revolution in Congress at Washington, D. C., in April. This follows the lead of the American Forestry Association, which organization has suggested to Governor Westmoreland Davis, of Virginia, that the highway to Mt. Vernon, the nation's shrine, be made a great "Road of Remembrance" and become a unit of the drives that should lead to such a memorial park as the Daughters of the American Revolution sponsor. The Association urges that Governor Davis invite the states to plant memorial trees along the highway to Mt. Vernon. Connecting as it does with the beautiful drive to Arlington, the drive in Potomac Park and the proposed river drive from Potomac Park to Rock Creek Park, the nation's capital has the greatest of opportunities to erect a memorial to the heroes of the World War such as no other world capital can hope to duplicate. The plan of the Daughters of the American Revolution called for the construction of a highway connecting the city of Washington with the park, which would be called Liberty Memorial Highway, and the suggestion was made that the park be used for study and experiment in forestry and agriculture and for the establishment of vocational schools. The resolution asks the United States Congress to appropriate money for this project, and to place the selection of the site and the development of the lands in the hands of a Liberty Memorial Park Commission, to include the Secretary of



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MEMORIAL TREE PLANTING FOR SOLDIERS AT BORDENTOWN, NEW JERSEY

To perpetuate the memory of men from the Bordentown Military Academy who fell in the war, memorial tree planting exercises were held at the academy on Arbor Day. Children of the city and Bordentown cadets participated in the exercises.

War, the Secretary of the Navy, the Secretary of Agriculture, the president general of the D. A. R., the president of the Sons of the Revolution, the president of the Sons of the American Revolution and three others.

The Club Women of Atlanta, Georgia, claim the distinction of having planted in one of the parks of that



STREET PLANTING OF MEMORIAL TREES

On Central Boulevard at Kewanee, Illinois, 31 memorial trees have been planted by the Women's Relief Corps, Mrs. Ada M. Taylor reports to the American Forestry Association. These trees have been named for the 31 heroes who gave their lives to their country, and the names have been entered on the Association's Honor Roll. The American Legion, G. A. R., and the Spanish War Veterans all had part in the ceremony. The trees were marked with a wreath, and later will be permanently marked.

city the first Authors' Grove in the United States. The unique idea first occurred to Mrs. Lollie Belle Wylie, whose original purpose it was to plant, each year, several trees in honor of favorite authors, under the auspices of the Atlanta Writers' Club, of which she is the president. The idea grew out of the desire that the Writers' Club, although primarily an organization engaged in creative work, should share in the civic welfare work of the community in which it exists.

No sooner was the plan announced than comments were made in all the daily papers, and interest immediately spread from one group of women to another, who in turn, asked that they too be allowed to share honors with the Writers' Club in planting memorial trees.

Eighteen of the most prominent clubs of the city entered with enthusiasm into making plans for Tree Planting Day. Eight more trees have been planted since the original eighteen were set out and the committee is steadily receiving letters asking for information from both clubs and individual tree lovers who wish to place a living monument in the grove, in memory of some beloved author. From present indications there will be a hundred trees growing in the authors' Grove a year hence.

The authors honored were: Jack London, Edgar Allen Poe, Joel Chandler Harris, Shakespeare, John Maysfield, Corra Harris, Frank L. Stanton, Granville Barker, Henry Brady, Martha Rutherford, Bill Arp, Emma LaZarus, Mrs. William Lawson Peel, Thomas Skeyhill, Harry Harmon, Charles W. Hubner, Edward McDowell, Lucian Lamar Knight, Virginia Arnold, Helen Gray, Dr. George Niles, Father Ryan, and Mrs. Lollie Belle Wylie, the mother of the movement.

The organizations which planted were: The Atlanta Writers' Club, the Atlanta Woman's Club, Joseph Habersham Chapter D. A. R., Colonial Daughters, U. D. C.,



A MEMORIAL TO CZECHO-SLOVAKIANS

Novel in the way of a memorial tree is a lipa, the Czecho-Slovak national tree, which is growing in Balboa Park in San Diego, California, to commemorate the visit of several large detachments of soldiers of that nation, returning to their homes after service in Siberia. The soldiers arrived at San Diego by transport direct from from Vladivostock and remained at Camp Kearny during a period of recuperation, after which they proceeded to the Atlantic seaboard. In the years to come, this tree is certainly entitled to a place in the Hall of Fame. A tablet placed near the lipa tree reads as follows: "Planted in commemoration of their independence and in memory of the sons of Czecho-Slovakia for their great sacrifice in the World War for justice and liberty. Dedicated July, 1919, when the Czecho-Slovak army visited our city on their homeward journey from Siberia, by the Czecho-Slovak National Alliance of San Diego."

Atlanta Music Study Club, New Era Study Club, Woman's Pioneer Society, Council of Jewish Women, Woman's Study Club, Modern Topics Club, The Reviewers, Daughters of 1812, Uncle Remus Association, Altar Society of Sacred Heart Church, Southern Mountain Association, Ladies' Board of Oglethorpe University, Nineteenth Century History Class, Drama League, Shakespeare Club, and individuals.

"HALL OF FAME" FOR TREES

Here is a tree that goes back to the days of pirates bad and bold, according to the data submitted by A. D. Dart, of Oriental, North Carolina. "Teach's Oak" is the name of this tree and Teach was a bad, bad man—so much so that even now the boys dig about the neighborhood of the tree for treasure.

In the early Colonial days, long before beacon lights were placed at the entrance of harbors to make the channels, prominent objects like big trees, had to serve for that purpose, and even now, as then, this old tree is a landmark and guide for sailors frequenting these waters.

Edward Teach, the notorious pirate—called "Blackbeard," because of the bushy black whiskers that covered his face, was born in Bristol, England, about 1690. Early in life he was a private sailor on a vessel commanded by one Kornagold, a noted sea rover in European waters. The latter having captured a large merchant vessel in 1718, put Teach in charge, and he seeking pastures new, started for the American coast, making captures on his way of many defenseless merchantmen. His favorite cruising ground was along the coasts of Virginia and North Carolina, seeking refuge, as occasion demanded, in the quiet waters of Albemarle and Pamlico Sounds and their tributaries, either to avoid severe storms or when pursued by war vessels. The latter were few in number during those days, and were generally of such deep draught that it was impossible for them to follow the piratical craft into shallow waters.

While the Pirate Teach has left no record of his exploits, it is only fair to assume that he must have obtained a great quantity of valuables of all kinds, from the many vessels he is known to have captured and sunk. If there are sermons in stones, and books in the running brooks, there certainly must be history in the old Water Oak shown in the accompanying picture, for it is a well established fact that "Blackbeard" and his villainous crew often frequented this point, and sought refuge and rest under the spreading branches of this famous tree, which for generations has been known as "Teach's Oak." So strong is the belief that much of his booty was buried under the tree, that great holes have been dug in many places around it, but as far as known no treasure has ever been found.

Finding it a hopeless task to capture the pirates who were committing so many depredations along the coast, the English king offered a pardon to all who would surrender and lead honest lives. Teach accepted the proposal and settled in Bath, a small town in Beaufort County, but the lure of the sea was so strong, and, becoming tired of such a quiet life, he very soon raised his black flag, and sailed away to once more become the terror of the seas.



TEACH'S OAK

Learning that his vessel was anchored in Ocracoke Inlet, near a small island of that name, on the North Carolina coast, Governor Spotswood, of Virginia, sent Lieutenant Maynard in search of the pirate.

The two met, and, after a desperate sea fight, Teach was killed, his head cut off and tied to the bowsprit of Maynard's vessel.

The body was thrown overboard, and according to the tradition of the Island, his muscular strength was so great that the headless body swam entirely around the Island!!—Presumably searching for his crew and vessel.

"HALL OF FAME" FOR TREES

In Audubon Park, New Orleans, stands a tree deserving of much attention. It is a gigantic live-oak and has been nominated for a place in the Hall of Fame for trees by Miss Viola Overman.

This oak is famous for four reasons: For its beauty; its name—Washington; its many yearly visitors; its size, for it is conceded by botanists and tree-ologists to be the largest live-oak in the world.

This tree has a rival. This rival is a venerable oak near Charleston, South Carolina. It, too, is known as the



THE WASHINGTON OAK

Washington Oak. The pretty story concerning it is as follows:

In the summer of 1791, at the time of the memorable pilgrimage of President Washington throughout his beloved Southland, he was an honored breakfast-guest in the beautiful suburban home of Mrs. Horry—of the distinguished Pinckney family.

President Washington heard the mistress of the household give an order to her gardener that the large oak which obstructed the view from the new portico must be cut down. The President—great tree-lover that he was—interceded with his hostess to spare the condemned oak.

Mrs. Horry could do naught but to accede graciously to the slightest wish of her distinguished guest. The gardener was summoned. The President's wish was told to him; the President's wish was Madam Horry's wish—the tree was spared.

The last account was that this Washington Oak is still alive. And is the object of much interest to Northerners as well as Southerners.

"HALL OF FAME" FOR TREES

At Admiral Peary's college, Bowdoin, Brunswick, Maine, is the Thorndike Oak, which has been given a place in the Hall of Fame. In nominating the Oak, Gerald G. Wilder, the Bowdoin Librarian, says:

"At the close of the first of the Chapel exercises, one of the students, George Thorndike, thrust an acorn into the ground, and half in earnest, half in jest, said a great tree would flourish long after he had gone. He died in 1811, in Russia, the first Bowdoin graduate to die, and the Thorndike Oak is still flourishing and year after year shelters the Seniors on Class Day. The date of the first of these chapel exercises above referred to is September, 1802. The tree was transplanted in 1803 from its original position near Massachusetts Hall to the President's garden where it has since stood." It will be easy to understand the veneration in which the old grads of Bowdoin wherever they may be, hold that tree which is so closely identified with their college life.



THE THORNDIKE OAK

THE EGGS OF BIRDS

BY ELSA G. ALLEN

ONE cannot find among the multitude of wonders in nature anything more marvelous than the development of an egg. Whether it be a butterfly which flourishes for a day only to die after depositing its eggs, or a reptile which lazily leaves its eggs with only the warm sand to mother them, or a fish, like the salmon, which, with incredible strength, jumps the rapids to spawn in the upper reaches of rivers, or most appealing of all, a bird which builds a beautiful nest for its treasures, the egg in every case is structurally the same, and the miracle of life unfolds according to the same laws of cell division.

A single cell marks the beginning of every organism. It divides into two cells, then four cells, and so on through the most intricate specialization of groups of cells. At last the perfected embryo, having used up the mass of food stored within the egg, must hatch and seek its livelihood in the great world where a thousand dangers beset it. For it is the most relentless law of nature that everything must struggle for existence, but another law provides that those forms which are subject to the most dangers produce the greatest number of offspring. Thus the progeny of many insects must number trillions that some may survive the birds which consume them by countless thousands. The cod risks its spawn to the open sea and must therefore produce millions of eggs that enough may survive to continue the species. The reptiles lay comparatively few eggs but likewise give them no protection, leaving them to be hatched by the heat of the sun or decaying vegetation. But in the realm of birds parental care for the eggs reaches its highest development.



Photograph by A. A. Allen.

NEST AND EGGS OF THE BLACKBURNIAN WARBLER

Birds which do not lay protectively colored eggs conceal them in well-hidden nests.

For as birds evolved from reptile-like ancestors and developed a constant body temperature, so their eggs, in order to develop, had to be kept continually warm. Because of this, nearly all birds, except the mound birds of Australia and the brush turkeys of New Guinea, incubate their eggs and herein lies the most fundamental difference between the eggs of birds and those of their ancient progenitors, the reptiles.

But while the eggs of reptiles with their white leathery shells are by no means beautiful, the eggs of birds are among the loveliest things in nature, and they have always held a great fascination for man. From the tiny hummingbird's egg, no longer than a bean, to the giant ostrich egg, which is between five and six inches in diameter, there is every gradation in size. But the size of the egg does not depend entirely upon the size of the bird which lays it. For example, the catbird and spotted sandpiper are practically of the same size but the sandpiper's egg is considerably larger. The reason is not difficult to find, for the young catbird upon hatching is still but poorly developed, tiny, helpless, featherless, homely to a pitiful degree, while the young sandpiper greets the world covered with down and ready to chase flies with its mother.

In like manner the length of the incubation period depends largely upon the stage of development reached by the chick before hatching. Birds such as the catbird and other perching species, which have altricial young needing care in the nest for some time, do not incubate their eggs as long as those like the shorebirds and ducks which have precocial young. The eggs of most of our common small birds require incubation for from ten days to two weeks. Those of the fowl-like birds such as the ruffed grouse about three weeks, those of the ducks about four weeks, and the eggs of the emeu, a large

ostrich-like bird of Australia, must be incubated for about ten weeks.

Much of the fascination of bird study lies in the questions which continually come to mind. Why do



Photograph by A. A. Allen.

A SPOTTED SANDPIPER AT HER NEST

The eggs of the sandpipers are large because the young are well-developed when hatched, being able to run about as soon as dry.

many of the sea birds lay only one egg and why must the ducks and partridges lay nearly a score? Why are some eggs pure white while others are most brilliantly



Photograph by A. A. Allen.

THE UNPROTECTED EGGS OF THE KILDEER

The kildeer lays her eggs on the bare gravel. They are very inconspicuous, however, because of their protective coloration.

colored and still others mottled with shades of brown like the sun-flecked forest floor?

The number of enemies which a bird has seems to control to a large extent the number of eggs which it lays. The auks, murres, and gannets, by their habit of retiring at the nesting season to isolated cliffs and islands, are comparatively safe from harm and therefore lay but a single egg. At the other extreme are the gallinules, ducks, and partridges with their ten to twenty eggs. Not only have these birds many enemies among the predatory animals, but, since they nest rather early in the spring their eggs are frequently flooded out by storms. Fortunate it is, if a clutch of eggs is successfully hatched, that the brood is large for it is more than likely that several of the young will be the victims of snapping turtles, snakes, and hawks.

This brings us to the coloration of eggs, which pre-



Photograph by A. A. Allen.

NEST AND EGGS OF THE RED-WINGED BLACKBIRD

The eggs are pale blue, streaked and spotted with dark purple and black, chiefly about the larger end. The addition of color and markings is the last stage in the formation of an egg. They are added slowly before the egg is laid.

sents problems more difficult to explain. We have heard a great deal about protective coloration in nature, and when we consider the advantages which accrue to protectively colored eggs we may wonder why some eggs have remained pure white through the ages, why others are of the most conspicuous greenish blue, and why still others stand out by their spotted or speckled patterns. We should bear in mind that white eggs are for the most

part laid by hole-nesting species of birds like the owls and woodpeckers, and since the eggs are well hidden in their dark cavities it has not been necessary for them to develop protective coloration. The bright greenish blue eggs of most of the thrushes, for example, must be hidden in nests which are concealed in dense vegetation and the speckled eggs of the ground nesting sparrows depend for their safety upon the good hiding of the grass-woven nest which contains them.

As one proceeds with the study of birds' eggs he will observe that each family of birds lays eggs of a certain type though some exceptions like the white eggs of the



Photograph by A. A. Allen.

THE NEST OF THE DAINTY HUMMING-BIRD

The eggs of this most exquisite of our little feathered friends are no larger than beans.

indigo bunting do occur and have yet to be explained. Thus the ducks lay plain colored eggs only slightly tinted with brownish, or greenish, or bluish. The shorebirds on account of building no nests, or very shallow ones, lay brownish spotted eggs which closely resemble their environment, and each family of landbirds likewise has its own type. The majority of the flycatchers, warblers, and vireos, for example, lay eggs which are white or whitish in ground color, the main differences being in the color and arrangement of their dots and speckles.

It is not surprising that these delicately fashioned wonders of nature should have lured thousands into the sport of egg collecting. But as we have gained a greater appreciation of the beauty and value of birds we have grown to consider egg collecting, except for scientific purposes, little better than wanton plunder, and today public sentiment protects the birds' home far better than all the fines imposed by law.

There is still another way, however, by which to enjoy the discovery of a bird's nest, a way more permanent



Photograph by A. A. Allen.

A BUSY MOTHER GALINULE

The Florida galinule lays a goodly clutch of eggs of from eight to thirteen, because both eggs and young are subject to many dangers. Here the mother is seen turning her eggs.

and instructive than a mere collection of eggs. Let the bird student take his camera into the field and secure a photograph of the eggs in their nest, their own proper setting. A well taken photograph will show not only the eggs, but the materials and position of the nest, which are as necessary to a correct understanding of a bird as are the eggs themselves.

ARIZONA PINE

In saintly service and seraphic praise
Before the face of God thy years are spent,
Thou priestly pine tree. Rich as sacrament
Thy shadows are unto the weary ways
Of man and bird and beast: the deep-toned lays
Of ocean from thy leafy strings unbent,
Beat to the fingers of the wind, and scent
Of prayerful incense round thy vesture plays.
Thou, royal pontiff of the wooded hills,
Outspread'st thy hands in benediction sweet
O'er all the tribes of restless woodland folk;
Thou shriv'st the squirrel, and the robin thrills
Thy leaves with hymns: all sylvan orphans fleet
For covert to thy sanctuaried cloak.

—M. J. Riordan.

GIVING MEDICINE TO TREES

BY DR. CAROLINE RUMBOLD

PATHOLOGIST, BUREAU OF PLANT INDUSTRY, UNITED STATES DEPARTMENT OF AGRICULTURE

CAN a tree be cured of a disease by giving it medicine internally? The usual method of combatting tree diseases is through the external application of sprays and fertilizers, or by cutting out and burning diseased parts or entire trees. Many parasitic fungi grow so deeply underneath the bark of a tree that any external treatment is ineffective. This is the case with chestnut blight, or the chestnut bark disease, as it is more properly called. When this fungus began to kill chestnut trees by the tens of thousands about fifteen years ago, it was not unusual for an owner of a prized ornamental chestnut to offer a reward of a thousand dollars to anyone who would save the tree. Numerous quack "tree doctors" advocated various alleged remedies which failed miserably when tested. Careful experiments by plant pathologists also failed to develop a successful method of saving a tree after it was attacked by the blight. The disease advanced ruthlessly and all who valued the chestnut trees were in despair.



METHOD OF INJECTING SMALL TREES

The chestnut trees in this orchard were infected with the chestnut blight, and it was desired to find if the fungus under the bark could not be killed by chemicals, without injury to the tree. As the tree absorbed the solution it was siphoned out of the jar through the tube.

In 1911, the State of Pennsylvania appointed a special commission to conduct scientific investigations to determine the cause of chestnut blight, and at the same time to immediately attack the epidemic by every means that seemed to afford any possibility of checking or delaying it. In connection with other lines of experimental work carried on by this commission, the writer was employed to investigate the possibility of controlling the disease by injecting chemical solutions into chestnut trees. In 1913, the Pennsylvania Chestnut Tree Blight Commission advised the Governor to discontinue its work because the blight had advanced too far into the State to make control practicable with the appropriation available at that time. During the next two years the writer continued the injection experiments under the direction of the Office of Investigation in Forest Pathology, Bureau of Plant Industry, United States Department of Agriculture. The University of Pennsylvania furnished laboratory facilities and many supplies. The credit for continuing these experiments to their present stage is due to Mr. Harold Pierce, formerly Secretary of the Pennsylvania Chestnut Tree Blight Commission, who generously financed the work.

The problem has been to find a chemical agent which would kill the fungus that causes the blight, when a solution was introduced into a tree. The first difficulty encountered was in getting the tree thoroughly injected with any kind of liquid. The sap of a tree does not circulate like the blood of an animal. The wood of a tree contains numerous vessels, or tube-like cells, through which the crude sap is conducted to the leaves to be manufactured into food which returns to the roots and other living parts through the inner bark. A substance in solution follows a vertical path up the tree through those vessels in the sap wood that are close to the place of injection. It can also descend through those vessels, but in all of this there is lacking that persistent passing and return of a stream, such as the blood stream, which constantly bathes the cells of the animal body. This path in the tree through which the injected solution passes, usually is but little wider than the hole through which it is injected. Besides this, the walls of the tubular cells act like blotting paper, with the result that the farther the solution passes from the point of injection, the weaker it becomes. So in order to inject a tree evenly on all sides, it is necessary to make a number of injections on different sides of the trunk, and even on the limbs. This means that many quarts of a very dilute chemical solution must be put into a tree if the chemical is to reach all portions of the tree. Were one to use only a small amount of concentrated solution,



INJECTING CURATIVE CHEMICAL SOLUTIONS

Another view of the apparatus used in injecting solutions into a tree. A glass jar containing the chemical solution was hung in the branches and connected by rubber tubing with a glass tube inserted in a small hole made through the bark of the trunk. This hole in the bark had to be made under cover of a liquid, otherwise air clogged the vessels of the wood and the solution would not be drawn into the tree. A clamp held the glass tube tightly against the tree.

it would kill the cells of the tree near the injection hole and would not reach other parts. This is one of the reasons why boring a hole in the trunk and filling it with strong chemical in either solid or liquid form is not likely to benefit a tree.

It was found to be essential to make the holes through the bark for injection purposes under cover of a liquid. If air enters before injection or with the solution, air-bubbles will clog the small tubes or vessels in the vascular bundles and prevent the solution's being absorbed by the tree. The reader will probably ask at this point if a tree whose trunk is peppered with injection holes is not seriously injured by such treatment. As a matter of fact, the trees with which the experiments were made did not suffer from this cause. The injections were made under sanitary conditions and only small holes were made. These were afterward filled with clean grafting wax, and a callus growth quickly closed up the wound, forcing out the wax plug. By the end of three years, there was not even a scar to show where the injection had been made.

The idea of introducing chemical substances into plants is more than two centuries old. The first report on tree injection for purposes of medication was published by a Russian scientist in 1894. This was followed by scattered work in America, France, Germany and Russia. Some successful results were reported, but in the main the effect of injected solutions were not beneficial or the results were inconclusive. The most practical method was contained in the Russian publications, and the Russion method of introducing solutions was used in the beginning of the chestnut experiments. Very soon however an easier and less expensive method was developed, in which the apparatus could be quickly adjusted to the trunk and left for twelve hours or more without further attention. On small trees, a glass container holding the solution to be injected was hung on a branch of the tree. The solution was led to the point of injection by a rubber tube in the end of which was a piece of small glass tubing which was inserted into the injection hole. The glass tube was held in place by means of a perforated rubber



CHESTNUT TREE IN WHICH LITHIUM CARBONATE HAS BEEN INJECTED

This shows the drying up of the chestnut blight canker. The dead bark was easily lifted out because the fungus was killed by the chemical.

cork, which in turn was pressed tightly against the tree trunk by a clamp, thus preventing leakage. This apparatus is shown in the accompanying illustration. A variation of this method was used on large trees. In place of the clamp, a link chain was placed around the trunk. It was tightened by turnbuckles and held the perforated rubber corks against the tree. The corks were protected from the metal chain by iron washers. A glass "T" tube, thrust through the cork, introduced the solution into the injection hole. The rubber tube leading from the reservoirs higher in the tree was attached to the vertical end

of the "T" tube. The free end of the horizontal arm of the "T" tube was tipped by a piece of rubber tubing; after the solution filled the tube, a tempered steel cutter was inserted through this horizontal arm of the "T" tube and driven through the bark of the tree. In this manner a small hole was made in such a way that no air could clog the vessels of the wood, and the solution to be injected began immediately to enter the tree. After the steel drill was removed, the free end of the rubber tubing was closed by a pinch cock. By this method any desired number of injections were made at one time. In these experiments, the hole cut for injection purposes was one-fourth inch in diameter and penetrated the wood to a depth of two annual rings.

It was found that all kinds of chemicals in solution could be introduced into the trunks, provided there was sufficient transpiration (evaporation of moisture) from



FURTHER ALONG IN THE OPERATION

This is the same canker as shown in the preceding illustration, with the dead bark removed, exposing the healed up edges of the blight canker. A year later this tree had thrown off the chemical and had become reinfected. However, this experiment indicates interesting possibilities for controlling tree diseases by injected chemicals.

the leaves to keep the sap moving. The transpiration was greatest in the case of chestnut trees when they were in full leaf and the day was sunshiny, dry, and a breeze was blowing. On cold, rainy days the trees took up very little of the injected solutions. The season of the year caused a great variation in the amount of solution absorbed by a tree, and also as to the part of the tree where the injected chemical went. For instance, if a lithium solution was injected in the autumn, when the nuts were ripening, a large amount of lithium collected in the fruits and in the ends of the fruiting branches. In the early



TREATMENT FOR LARGER TREES

A number of injections had to be made at one time in the larger trees, enabling the chemical solutions to reach all parts of the tree. This illustration shows three glass containers hung in a chestnut tree, and a chain clamp that was used to hold the tubes in the holes made through the bark. On a clear day in midsummer a tree of this size absorbed many quarts of solution.

spring, when the leaves were unfolding and growing, the lithium spread through the tree and less of the chemical reached the leaves. In Pennsylvania, June was the best month for injection so far as the rate of intake was concerned; then July, May, August, September, October and April. The rate of intake varied more in April, May and June than in the summer and autumn months. Solutions of organic compounds went into the trees more readily than solutions of inorganic compounds, and the "true solutions" more readily than the colloidal. The average amount of solution absorbed through a single injection hole by an orchard chestnut tree, 15 feet high and with a wide, rounded top, ranged from one-fourth pint per day in April to three-fifths pint per day in June. But there are records of three and nearly four quarts of solution passing through an injection hole one-fourth inch in diameter in 20 hours. Chemical solutions, with very few exceptions, were absorbed more readily than the pure water. Also, the more concentrated the solutions of chemicals, the more rapidly they were absorbed. In several cases, lithium injected into the trunk could be detected 10 hours later in the leaves of branches at the top of the tree.

Fifty-six organic and inorganic substances in solution were injected. The trees used in the experiments were orchard trees, for the most part Paragon scions grafted on native chestnut stock, but some trees growing under forest conditions were also injected. Most of the trees

were already infected with the chestnut bark disease. The cankers were outlined with paint at the time the chemicals were injected into the trees, so that an accurate record of the effect of the chemical on the fungus was obtained. The war interrupted this work before it had gone further than to show interesting indications. In the case of diseased chestnut trees injected in the spring and early summer months with dilute solutions of lithium carbonate and lithium hydroxide, the fungus causing the blight was checked in its growth and the trees started to form a callus at the edge of the canker. In some cases this callus growth resulted in so completely cutting off the diseased tissue from the rest of the tree that the diseased portion dried out and could be picked off like any other dead bark. However, the lithium was gradually eliminated from the tissues of such trees and they were then subject to reinfection by the disease. Thus, the success in controlling the blight has so far been only to find a temporary check.

The results of these experiments indicate that there is a large field for further research on the possibility of finding a cure by the injection method for chestnut blight and similar parasitic fungi that grow beneath the bark of trees. This work is preliminary only and has not solved the problem. It took many years of patient experiment to develop salvarsan, and this solved a problem as apparently hopeless as that of finding a practical remedy for the chestnut blight.

The subject is intensely interesting and will undoubtedly be further explored in the future. In the meantime, owners of chestnut and other valuable shade trees should know that itinerant "tree doctors," who claim wonderful curative powers for mysterious substances inserted into trees, are not likely to have been successful in achieving that which years of careful scientific research have failed to produce. This statement is not intended to reflect on trained men who are conducting legitimate tree surgery operations, but is directed against those "quacks" who prey on the ignorance of shade tree owners by selling worthless "remedies" at fabulous prices. Such persons not only get their money through fraudulent representations, but frequently cause death or serious injury to a valuable tree.

NEED OF FORESTS FOR WOOD PULP*

BY E. T. MEREDITH, SECRETARY OF AGRICULTURE

THE United States is today facing the most critical pulp and paper situations in its history. Of these the newsprint situation is the most serious. Present demands, abnormal though they may seem, are merely an incident in the rapidly growing normal demand for newsprint paper.

Today we are dependent upon other countries for the equivalent of two-thirds of the pulpwood, pulp, or newsprint which goes into American newspapers. Our newsprint industry is concentrated largely in New England, New York, and the Lake States. I am told that sixty per cent of the pulp and paper concerns in New York have no stumpage of their own, and that less than five have enough timberland for continuous future operation. The predicted life of the industry in New York, New Hampshire, and even in Maine, where the great bulk of our eastern pulpwood still remains, is alarmingly short.

We have on the other hand, large quantities of suitable newsprint woods in the Pacific Northwest and in Alaska. The annual growth of timber on the National Forests of southeastern Alaska alone would supply half of our present American newsprint requirements. Here the industry is undeveloped.

A far greater degree of independence in newsprint manufacture can be accomplished by two measures—the development of the industry in the Pacific Northwest and in Alaska, and the large-scale growing of timber in New England and the Lake States. Both of these measures would be greatly stimulated by the passage of the Poindexter Pulp Survey bill now pending in the Senate. A pulpwood survey would secure the facts on which a sound development of the industry in the Northwest and in Alaska could be based, and it would also afford a basis for the production of pulp timber in the Lake States and in the Northeast.

The American Pulp and Paper Association has urged the purchase by the Government of large areas suitable for the growing of pulpwoods. The Government has made a beginning in this direction during the past decade. In New Hampshire and Maine an area of about 362,000 acres has been acquired admirably adapted for this purpose. This area should be greatly enlarged to include much of the mountain region in New Hampshire, Maine and Vermont.

We already have some technical knowledge of the best methods for growing the pulp timbers of the Northeast and the Lake States, enough to begin intelligently; but a great deal of investigative work remains to be done. If the pulp industry of the Northeast is to be perpetuated in anything approximating its present size, the entire forest area of the region must be utilized to the limit of its productive capacity. This is hardly less true of the Lake States. Forest experiment stations alone will, in any reasonable time, furnish the required knowledge of the best methods of cutting, planting, production, and the various other steps in such intensive timber growing. Bills now pending in both Senate and House of Representatives provide for experiment stations on the White Mountain National Forests in New England and in Minnesota.

Protection of forests from fire is perhaps the most important single requirement in the growing of

** From a letter by Secretary E. T. Meredith, to the American Paper and Pulp Association.*

timber. Twenty-four States are receiving co-operation. These States expend yearly for fire protection upwards of $625,000, and private owners of forest land within their borders expend in normal years approximately a like amount. The Federal appropriation is but $100,000, which is entirely inadequate. This amount has remained unchanged since 1915, in spite of the fact that the number of co-operating States has increased from 18 to 24, and the cost of the work has practically doubled. The national policy of forestry advocated by the Forest Service contemplates a large extension of such co-operative fire protection. Not less than $500,000 is required to meet the needs of this situation adequately. Yet the present appropriation is but $100,000 and there is even danger of its being reduced.

The Forest Service is conducting at its Forest Products Laboratory work of very great and immediate importance to the pulp and paper manufacturer. Limited though such work is, it has already covered a large field in the suitability of various American woods for the different kinds of pulp, and incidentally has developed information of great importance on the technique of the various pulp-making processes. Along a limited number of other lines it has also been possible to make a beginning, as, for example, through co-operation, on the causes of and remedies for the molding and decay of pulp. The work already under way should be very materially expanded, and there is a wide range of other subjects on which intensive investigations would benefit both the public and the pulp and paper industry.

THE NEED FOR AN ARMY FOREST SERVICE

MANY perhaps believe that the great war which we have just been through revealed for the first time the necessity of an Army forest service charged with meeting the needs of the combatant units for wood. This is not true, says J. Demorlaine, a Frenchman interested in forestry, and he adds: "A chapter in the 'Exploitation des Bois' by Duhamel du Montceau proves the contrary, and is worth recalling today. One might believe that the passage was written yeesterday; yet it dates from 1764.

"Armies in the field," wrote Duhamel du Montceau, "in addition to their need for fuel, often have to construct entrenchments, to build barracks in the fall, or to conduct sieges or systematic attacks. For all these purposes considerable quantities of material are needed, which are naturally cut in the forests within easiest reach of the places where they are to be used. These expeditions are the ruin of the forests, especially when the cutting is done by regular troops, who seem to take pleasure in causing more damage than is necessary.

"The materials needed consist both of timber and of smaller products, such as twigs, withes, and pickets. These smaller products, after being brought from the forests, are made into various kinds of fascines, faggots, gabions, blinds, candle-holders, and litters.

"Often cuttings are made in those parts of the forests that are most accessible and most convenient to the roads and railroads, as a result of which the district is ruined, whereas if the choice were extended over the entire forest this might not be the case.

"Finally the fact that these supplies must nearly always be furnished under pressure during the exigencies of open war, causes the work to be done with a haste that is very apt to increase the disorder and to ruin the forests still further.

* * *

"The ordinary soldiers who are entrusted with securing these materials usually spread out in all directions, cut the coppice high in order not to inconvenience themselves, break off and damage more wood than they carry away, wound just for amusement all the trees that they meet, and commonly do the woods an injury which can be repaired only after a very long time.

"Whenever these contributions, which bear with particular severity on those districts in the theater of operations, can be supplied with any sort of economy, it would be wise of the commanding general, mindful of the fact that such devastation can profit no one and that it ruins the country for many years, to impose them systematically on the country and to send his troops for them only in case of absolute necessity.

"As for the damages done to our forests in securing war materials, a remedy could easily be supplied by having forest officers work with the Engineer Corps, since these know better than any one else how to conduct operations with a wise economy."

If the Inspector General of the Navy under Louis XVI were to return among us today, he would doubtless recognize with pleasure that his vision had been clear and that his ideas, 150 years later, had succeeded in justifying themselves. Consummate observer, forester in the best sense of the word, Duhamel du Montceau foresaw the indispensable organization of an Army Forest Service.

So this prophecy, inspired by the best of good sense, teaches and serves us. The role of the foresters in time of war has just been completely demonstrated.

The war of 1870-71 had perhaps confused people's ideas somewhat as to the mission that foresters would be called upon to fulfill in the field. The progress of modern war, which can only become still further accenuated, will render more and more necessary an autonomous Army Forest Service, with the same standing as the Engineer or Quartermaster Corps. This service should have its own life and its own military status in time of peace. It should direct the formation, management, instruction, and organization of the companies of mobilized foresters, or Forest Sappers.

This is the true solution of the problem of the conservation and at the same time the exploitation of the forests for the needs of war. "There is nothing new under the sun."

THE FALL WEB-WORM AND THE SWALLOWTAILS

BY DR. R. W. SHUFELDT, R. A. O. U.

(Photographs by the author)

INVESTIGATING the life histories of the larvæ or caterpillars of our moths and butterflies, the fact is soon discovered that the majority of them feed upon the leaves of a great variety of plants, shrubs, and trees. Where such defoliation does not affect man's interests, but little heed is given to it, except by the entomologists. Where the larvæ are small, more or less rare, and non-communal by habit, the effects on leafage is comparatively very slight. It may be slight, too, where the caterpillars are of the largest sort, not abundant, and a comparatively small number attack the foliage of any particular tree or plant. On the other hand, where the larvæ of any special moth mass in broods in certain trees, feed upon the foliage, or weave their common web so as to envelope leaves, and consume them, we have in such larvæ species that constitute a pest. The destruction that they do is not lost sight of until the following season, should the trees rally from the injury done and leaf out once more.

A good example of the first species referred to is seen in the caterpillars known as the forest tent caterpillars, the *Clisiocampa sylvatica* of Harris, which feeds on the leaves of different trees and shrubs, and is especially destructive in the case of the wild cherry trees. This species of larvæ construct a web in the fork of the tree where they were hatched out, and very soon commence to prey upon the leaves. The writer, in order to study their development, reared several hundred of these larvæ, feeding them on the leaves of the common wild cherry. It was amazing to note their rapid growth, the enlargement of their web, and above all the enormous number of leaves required to keep them fed. A limb with upwards of an hundred large cherry leaves upon it would be entirely consumed in the course of a couple of hours. These caterpillars grew rapidly, and spun a great number of small, white cocoons. From these presently emerged many beautiful little brown moths, with broad, dark, oblique bands on their upper wings. The pupæ from which these came were strong and of a deep mahogany brown color.



PART OF A BROOD OF FALL WEB-WORMS

Fig. 1. This brood was collected by the writer on a Red Mulberry tree (*Morus rubra*) in the rear of No. 1745 Park Road, N. W., Washington, D. C., early in June. These larvæ are in the early stages of their growth, and of varying sizes. Natural size; from life.

Such experiments are extremely interesting, and one of the most recent ones of this nature undertaken by the writer was a brood of the larvæ known as the Fall Web-worm, which formerly passed under the scientific name of *Hyphantria cunea* of Drury, but now called *H. textor* of Harris; its moth is also known as the Fall Web-moth.

Early in June, when passing through an alley in Washington, D. C., the writer noted, in some seven or eight places in a mulberry tree, that broods of a certain caterpillar had spun their webs about masses of leaves at the extremities of twigs, and were devouring them. These broods averaged several hundred—up to a thousand—in each community (Fig. 1). The owner of the tree inquired what ought to be done; she was advised to cut off the twigs bearing the webs and their occupants, and to dip each in a pail of boiling water. The expedient saved this splendid tree from complete defoliation during the next few weeks.

A large box with a tightly fitting cover of fine gauze wire made an admirable "breeding-cage" in which to place the reserve brood taken from the tree. Therein they were fed with the leaves of the mulberry tree and grape-vine until the early part of July, and it was

astounding to note the enormous amount of fodder they got away with in one night. As many as fifty grape-vine leaves were placed in their cage in the afternoon, in layers; the next morning only their stems and coarse veins or ribs remained.

As will be noted in Figure 1, these caterpillars are extremely hairy, and range in length from one to about three centimeters. They are a pale, yellowish green, with a darkish stripe down the middle of the back. On either side of this there is a longitudinal row of some ten minute dots. As these larvæ mature, the dorsal stripe gradually becomes almost black, and the animal grows much stronger. When very small they consume only the soft parts of the leaves, completely skeletonizing each leaf before leaving it. As they grow bigger and stronger, however, the entire leaf is consumed, and only the stem and stoutest ribs are left.

Changing the kind of leaf they were fed upon, produced no change in the color of the caterpillars, and their heads are always black. While the pattern remains very much the same in the adults, it does vary somewhat in color-shade, even in individuals of the same brood. The hairs are invariably light-colored, and each springs from a small, deep-yellowish-black wart at its base. Autumn specimens are darker than those composing a spring brood.

When these caterpillars get hungry, they swarm on the outside of their web; and on one occasion the writer had a small branch of a mulberry tree, carrying a large web with its owners, in his study. It was screwed into a small vise, which was attached to the top of a big tripod. There were some 250 of the caterpillars on the outside of the web. When the room was perfectly quiet, they all remained motionless; but should any one suddenly speak or clap the hands together, every one of the caterpillars would commence violently swinging the front half of its body, while the rear half remained still. This extraordinary procedure they performed in unison, sometimes keeping up the swinging for as long as fifteen or twenty seconds, depending upon the loudness and character of the noise that started them. Should the cause of the disturbance cease, the entire brood would stop their wagging motion at the same instant, and not one of them would move for several seconds. This is a very remarkable habit; the writer has never observed anything like it in any other species of caterpillar.



THE MOTH OF THE FALL WEB-WORM

Fig. 2. These are living and cabinet specimens of this moth (*Hyphantria textor*), with a pupa *in situ*. The living specimens are the ones with the wings closed, and the pupa is distinctly seen in its opened cocoon to the right. The males are the smallest specimens.

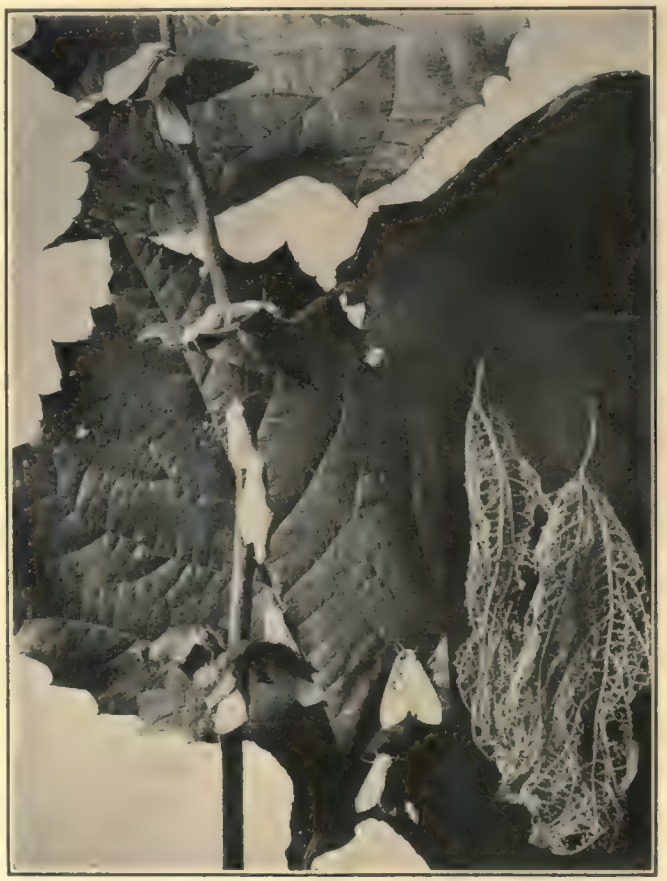
About the first week in July, the entire brood became very restless in their cage, and the smaller specimens readily escaped every night through the openings in the wire gauze. Between the 7th and the 14th of July, the full-grown individuals commenced to pupate, a few at a time, and they built their cocoons among the dead leaves at the bottom of the box. On or about the night of the 10th, however, there apparently arose in the full-grown specimens a common impulse to make their escape, and some two hundred of them, in some mysterious manner, squeezed themselves between the wire cover of the box and the edges of the box itself, escaping into the room. In the morning not a dozen of them were in sight, and not over twenty of them were left in the box. Neither were any of the pupæ visible; but that is not to be wondered at, as there were no end of places where the caterpillars could hide, the room being filled with all sorts of things usually found in a naturalist's workshop. There is but one large window in the room, facing west; so that on sunny days, when the shade is raised and the blinds thrown back, it is flooded with sunlight for hours. On bright moonlight nights, it may likewise be lit up in that way. Beautiful little pure white moths, few in number, began to make their appearance on the big pane of this window in the morning, the imagoes having made their emergence from the pupæ sometime during the night. This became the rule—in fact, there was a fresh crop of these moths on the window-panes every morning for the ensuing fortnight. They ranged in number from a dozen to thirty for every lot that appeared, all coming to the window during the night, and not being seen in any other part of the room. Over two hundred moths were thus taken during the entire time of emergence, and on the 28th of July only three moths came out—a male and two females.

With one exception, all these moths were pure white. The exception proved to be a male that had very minute black spots on the middle of either upper side of the front wings. The females are seen to be one-third larger than the males, and the very tiny green eggs they carried were distinctly visible through the thin skins of their abdomens. The males out-numbered the females about three to one, while their activity was no greater. In fact, after finding a resting-place, they all settled down as here shown in Figures 2 and 3, remaining so during

the entire time, taking to flight only when persistently disturbed. At night they were restless, especially on rainy nights, when they fluttered up and down the window-panes. By not gathering any on three consecutive evenings, on the morning of the fourth day there were no fewer than eighty-three of them on the window, a good proportion of which were females.

The eggs are very small, of a bright pale green color, and were deposited in patches. At their margins, these patches were irregular, the largest one covering an area of about a square inch. In a few cases a female would deposit a small patch of her eggs on the wings of another moth which had gotten beneath her. In about ten days, these layers, all sticking fast, were seen to change color, becoming a pale, whitish yellow. No attempt was made to encourage hatching.

In his "Field Book of Insects," Frank Lutz says: "The unsightly nests of the Fall Web-worm, made in late summer, are frequently confused with the spring tents of *Malacosoma americana*. The nest of *cunea* has a lighter texture, and covers all the leaves upon which the colony of larvæ are feeding; it occurs on more than a hundred different kinds of trees, apple and ash being among the favorites." *Fall* nests of the larvæ of this moth have never been seen by the present writer in the District of Columbia; but that may be due entirely to the fact that no special search has been made for them in this section of the country. Lutz points out and figures "the great varability which exists in the markings of both larvæ and adults."



TWO SKELETONIZED LEAVES OF THE RED MULBERRY

Fig. 3. These show the work of the smallest fall web-worms, with a number of the moths of this species on the sycamore leaves to the left. These moths are all from life, reduced one-third in size; the males are the smaller ones.

Of *"pallida"* of Packard he says: "The larvæ are social in their habits, and spin great webs upon the foliage of almost all kinds of deciduous trees in late summer and fall, and do a great deal of damage to orchards and nurseries. The insects pupate in loose cocoons, in crannies, and even under the loose surface of the soil. The species ranges over the United States from southern New England and New York to Texas and further west."

All the insects raised by the present writer had black antennæ and immaculate wings and bodies, barring the single specimen noted above. Perhaps the most formal account we have of the Fall Web-worm is the one that the late Professor C. V. Riley gave us in his brochure entitled, "Our Shade Trees and Their Insect Defoliators." Professor Packard reproduced this in full, including the cuts, in his "Insects Injurious to Forest and Shade Trees," which appeared in the Fifth Report of the United States Entomological Commission. This report is a very valuable one, and should be consulted by those interested in the protection of a great many of our trees, a list of 108 different kinds being presented, upon the leaves of which the Fall Web-worm feeds. In this list care has been taken to show the percentage of defoliation done by these larvæ in any particular species of tree.

Riley's report contains some very instructive illustrations. One gives the "Ravages of the Web-worm on poplars on one side of a Washington street, and exemption of maples on the other." Here we see, on Fourteenth Street, late in September, a row of large poplars stripped almost entirely of their leaves; and we have no reason to believe that such a calamity may not occur again. Indeed, the very larvæ described here may be some of an advance guard of the Fall Web-worm moth, which another season may be in Washington in millions.

The smaller cuts in the body of Riley's account give a specimen of the Fall Web-worm moth in position on a leaf laying eggs, with nine of the eggs enlarged; then we have a dark larva of the moth seen from the side; a light larva from above, with two views of the pupæ and the upper view of a spread moth. Finally, there are ten cuts of wings from "a series of moths showing the variation from the pure white to one profusely dotted with black and brown."

It is further stated that "the caterpillars of this moth have quite a number of external enemies, which slay large numbers of them." Several cuts are presented illustrating these enemies, as one of the Rear-horse (*Mantis carolina*); the *Podisus spinosus;* also the pupa, larva, and egg of the latter; an egg parasite; the *Meterorus hyphantria,* with its cocoon—a sort of small, ichneumon-like insect, of which Riley says: "This insect has performed a very good service during the caterpillar plague, and has done much to check any further increase

of the Web-worm." A full account of its reproduction and modes of attack is given. Two other insect enemies are also illustrated and fully described—these are an Apanteles and a Tachina-fly.

These latter destroyed thousands of the Web-moth caterpillars during the plague of 1886, when the city of Washington and parts of its environs was overrun by them. "As long as the caterpillars were young and still small, the different communities remained under cover of their webs, and only offended the eye. But as soon as they reached maturity and commenced to scatter, prompted by a desire to find suitable places to spin their cocoons and transform to pupæ, matters became more unpleasant, and complaints were heard from all those who had to pass such infested trees. In many localities no one could walk without stepping upon caterpillars; they dropped upon everyone and everything; they entered flower and vegetable gardens, porches and verandas, and the house itself, and became, in fact, a general nuisance." It is said that along the tracks of the Baltimore and Potomac Railroad, the cottonwoods and white poplars were entirely stripped of their leaves for a distance of five miles out from the Capitol.

As stated, all the eggs laid by the moths reared by the writer were of a green color—a very light green. Each female deposited from four to five hundred of them, and in nature these are found either on the upper or under sides of a leaf selected to receive them. Riley's observations, however, led him to state that "the egg is of a bright golden yellow, quite globular, and ornamented by numerous regular pits, which give it, under a magnifying lens, the appearance of a beautiful golden thimble. As the eggs approach the time of hatching, this color disappears, and gives place to a dull, leaden hue." The writer also examined a large number of the eggs of this moth with a high-power microscope, and they looked like big, green, pitted billiard balls, placed in contact with each other, as far as physical tangency could be carried out, through the entire mass. Like all such structures, they are extremely beautiful objects when thus examined.



TWO VIEWS, NATURAL SIZE, OF THE GIANT SWALLOWTAIL

Fig. 4. This black and yellow butterfly (*Papilio cresphontes*, Cramer), is one of the largest in our fauna; it is very abundant in the orange orchards of Florida, where it is known as the "orange dog;" it is claimed that its caterpillar feeds on the leaves of those trees. The upper view as seen from above, and the lower view as seen from below.

Very few people see any beauty in a caterpillar—the larval stage of some elegant moth or other which every one admires. However, many caterpillars are extremely beautiful, not so much with respect to their forms as the wonderful coloration of some of the species. As to the harm they do to the leaves of many trees—it is but the nature of the creatures, and man is the only animal on earth that complains of their ravages. To read the accounts on the subject of our popular entomologists, one would think that all those species of

caterpillars given to defoliating shade trees in the city streets make their foraging invasions for the sole purpose of tormenting man, injuring him financially, and, in general, militating against his material interests. These writers seem to think that the parasites that prey upon these caterpillars are in the world as a mere factor of mitigation, and at work solely along those lines to eliminate, as far a psossible, all such insect forces as operate against these particular interests of man, into which latter category surely many caterpillars fall.

Our various casts of mind and the diversities of our sense of appreciation regarding such forms are truly remarkable. To some, the big, horned caterpillar of the Regal moth is a "horrible thing," from whatever angle it may be regarded; while to others it is an object of admiration, whether considering its extraordinary form and appendages, or its superb coloring, or the history of its more than wonderful metamorphosis. It is not difficult to conceive what the moths, the butterflies, their larvæ, and their parasitic and other enemies think of it; and were it possible for them to state their claims to their right to inhabit this planet, to live and reproduce their kind, they would surely convince any fair-minded jury as to their validity.



OUR BEST KNOWN SWALLOWTAIL BUTTERFLY, AND SEEN FROM ABOVE. THE MALE OF THE COMMON EASTERN SWALLOWTAIL (*Papilio asterias*, Fabricius).

Fig. 5. The principal colors of these species are yellow and black; but the inferior wings have also a curved row of long azure markings, terminating at their lower inner angles in a conspicuous spot of yellow, black and red.

Many people will be glad to know that although larvæ or caterpillars of butterflies feed upon the leaves of many kinds of plants, shrubs, and trees, they rarely commit the wholesale damage that the caterpillars of moths do. Few groups of our United States butterflies are more widely known that those representing the genus *Papilio*, or as they are named in the vernacular, the Swallowtails. Most of the species are of good size, a large proportion of them being characterized by having a tail-like appendage springing from the inner third of the margin of either of the lower wings (Fig. 4). Indeed the wings of any of the five hundred or more distinct forms of this group vary greatly. Some even lack the tail-like appendage, while some foreign forms may have two or even three "tails" on either hinder wing. We have more than thirty different species in America, and new ones are constantly being added to the list.

Our Giant Swallowtail (*Papilio cresphontes*) is found in Florida, and a superb example of it is here shown in Figure 4, having been captured by Mr. R. H. Young, of Haines City of that State, and transmitted by mail. The caterpillar feeds upon the leaves of the orange and grape-fruit trees, and the nurserymen have given it the name of "Orange Dog;" they claim that their trees suffer from its depredations. Its range is now being greatly extended, and this big butterfly has even been captured in Canada. Although its main colors are but two, black and bright yellow, it is a very conspicuous species wherever seen, and it forms a very striking addition to the cabinet. This Giant Swallowtail has a very close relative in the Thoas Swallowtail (*P. thoas*), a Mexican species, sometimes taken in the lowermost parts of Texas, especially in the hot, arid regions. This is also a black and yellow form; but the areas of the distribution of these colors are not quite the same as we find in *P. cresphontes.*

Our most abundant form of Swallowtail east of the Mississippi Valley is the familiar *Papilio asterias* (Fig. 5), a form famous throughout the Atlantic States southward to include the entire Gulf tier of States. The species is subject to considerable variation in size and in intensity of the markings. A very considerable aberration in which the yellow spots cover almost the entire outer half of the wings has been found on several occasions, and was named *Papilio calverleyi* by Grote.

Ever since the dawn of the biological sciences, the study of the world's fauna of moths and butterflies has occupied the minds and time of thousands of earnest students. We now have a superb literature upon the various fields of research covered, carrying an enormous body of illustrations of every conceivable description. Apart from the study of fossil forms, we have to deal with the collecting and breeding of every specific and subspecific form of butterfly and moth in the world, and there are a great many thousands of them. To some extent, these have already been dealt with; but where they have not, the species must be examined superficially and structurally, described, and figured. We must also make record of the reproduction of any particular species, as its eggs, larva, pupation, and so on, together with an intimate investigation of its habits in nature. Then we have the matter of geographical distribution to deal with; variation of species; the preparing of specimens for the cabinet, and for study in schools and museums; modes of capture, and some eight or ten other lines of investigation and research.

In previous numbers of AMERICAN FORESTRY it has been pointed out how important a number of these fields of inquiry are to those interested in the protection, propagation, and study of our forests and shade trees, and the subject is one that will bear a considerable amount of elaboration. All this goes without the saying; but upon the other hand hardly a word has been said

with respect to how, when, and where to collect the larvæ of our moths and butterflies, their pupæ, or the insects themselves. Such work demands a sufficient knowledge of entomological literature to enable the student to identify species and subspecies when they come to hand; their various methods of breeding them successfully in captivity, and their collecting in nature and subsequent preservation.

When properly preserved in modern cabinets, moths and butterflies form one of the most beautiful and instructive series of objects that can be imagined; while the collecting of such material in their various haunts has so much to be heartily recommended in it, that not a few books have been wholly devoted to it by students of every civilized nation in the world. Even some of our commonest butterflies, such as are here shown in Figure 5—were it possible to present them in their natural colors—are, when perfect, of surpassing beauty.

Aside from the moth and butterfly collecting as a lucrative enterprise, in various parts of the world, it possesses the advantage to the individual of open air exercise; the cultivation of the spirit of travel; the development of the power of correct observation; the training of all the special senses; the formation of the habit of literary research and review of museum and private collections; the making of agreeable and desirable acquaintances and friends, with various other advantages thrown in.

Many years ago, the late Alfred Russel Wallace, the co-investigator in the field of organic evolution with Darwin, was a correspondent of the writer's after his return from England from his famous sojourn of eight years in the wilds of the islands of Malay Archipelago. Subsequent to his return in 1862, Wallace published one of the most interesting books of travel that ever came off the presses. He was a most enthusiastic collector of all sorts of living forms in the field, especially so with respect to the gorgeous specimens of moths and butterflies that occurred in the fauna of those great islands that he explored in the eastern seas. That book appeared in 1869, since which time the writer has read it through three times from cover to cover.

While in Sumatra, Wallace collected some remarkable species of *Papilio,* of which he presents several figures in his book. They have the same general form as the butterflies of this genus considered in the present article, while upon the other hand they show some very curious differences. The observations were made at Lobo Ramau, a central point at the east end of Sumatra. He says that "during a month's collecting, I added only three or four new species to my list of birds, although I obtained very fine specimens of many which were rare and interesting. In butterflies I was rather more successful, obtaining several fine species quite new to me, and a considerable number of very rare and beautiful insects. I will give here some account of two species of butterflies, which, though very common in collections, present us with peculiarities of the highest interest.

"The first is the handsome *Papilio memnon,* a splendid butterfly of a deep-black color, dotted over with lines and groups of scales of a clear ashy blue. Its wings are five inches in expanse, and the hind wings are rounded, with scalloped edges. This applies to the males; but the females are very different, and vary so much that they were once supposed to form several distinct species. They may be divided into two groups—those which resemble the male in shape, and those which differ entirely from him in the outline of the wings. The first vary much in color, being often nearly white, with dusky yellow and red markings; but such differences often occur in butterflies. The second group are much more extraordinary, and would never be supposed to be the same insect, since the hind wings are lengthened out into large spoon-shaped tails, no rudiment of which is ever to be perceived in the males or in the ordinary form of females.

"These tailed females are never of the dark and blue-glossed tints which prevail in the male, and often occur in the female of the same form, but are invariably ornamented with stripes and patches of white or buff, occupying the larger part of the surface of the hind wings. This peculiarity of coloring led me to discover that this extraordinary female closely resembles (when flying) another butterfly of the same genus, but of a different group (*Papilio coon*); and that we have here a case of mimicry similar to those so well illustrated and explained by Mr. Bates. That the resemblance is not accidental is sufficiently proved by the fact that in the north of India, where *Papilio coon* is replaced by an allied form (*Papilio Doubledayi*) having red spots in place of yellow, a closely allied species or variety of *Papilio memnon* (*P. androgeus*), has the tailed female also red-spotted. The use and reason of this resemblance appears to be that the butterflies imitated belong to a section of the genus *Papilio* which, from some other cause or other, are not attacked by birds, and by so closely resembling these in form and color the female of memnon and its ally also escape persecution. Two other species of this same section (*Papilio antiflurs* and *Papilio polyphontes*) are so closely imitated by two female forms of *Papilio theseus* (which come in the same section with memnon) that they completely deceived the Dutch entomologist, De Haan, and he accordingly classed them as the same species.

"But the most curious fact connected with these distinct forms is that they are both the offspring of either form. A single brood of larvæ were bred in Java by a Dutch entomologist, and produced males as well as tailless females; and there is every reason to believe that this is always the case, and the forms intermediate in characters never occur."

This rather full quotation from Wallace sees its justification in the fact that it is so pregnant with useful lessons in entomology in general and the study of moths and butterflies in particular. Our own forms in these groups have, to be sure, been extensively written up; but then, be it known, there still remains a whole lot in the lives of many of them of which we have not, at this writing, a single line of information.

GRANDSIRE LOON'S MISTAKE

BY FRANCES H. UPTON

MR. and Mrs. Louis Loon had a summer home on a big lake away up in New Hampshire. They usually went there in May and stayed until the lake froze over. After the ice came they could not get any more fish so they went back to the seashore for the winter. of course, you know the sea does not freeze over except around the edges and so the Loon family could get plenty of food there even in cold weather. But they liked best their own lonely northern lake and spent just as much time there as they could. Mr. Loon's family had been going there for years and years. Old Grandsire Loon had considered it quite the choicest spot for a summer home.

"YOU know," he remarked to Grandmarm Loon, shaking his coal black old head (for loons do not turn grey the way we human beings do), "I roamed about a bit in my young days—all over Canada and Hudson Bay—and I never found a place so well suited to our family as this is." "Yes," Grandmarm agreed, "it is just the place for the children—the swimming and the fishing are good and the water is cold." "Our family has always had a fondness for cold water," she added, and her collar of snow white feathers ruffled with pride. "The best thing of all," said Grandsire, "is, that there are none of those horrid, bold human beings about, and I really believe they haven't discovered our lake at all, thank goodness."

YOU see Grandsire Loon had once met a bold bad hunter with a gun, and if he had not dived and swam under water as quick as a wink, the bullet from that gun would have killed him. Now, he thought that all human beings were alike, and here is where he made a great mistake, as you shall see, if you have patience.

YOUNG Mr. and Mrs. Louis Loon were a very smart young pair. Every year they raised two children, and sometimes three. Early in June, Mrs. Loon went to her favorite nesting spot on the sandy side of Big Island, and there she and Louis made their nest. You would think it was the oddest looking nest you ever saw. Right near the waters edge Mrs. Loon scratched a hollow place in the sand with her queer, webbed feet. Meanwhile, Louis waddled around and picked up sticks with his sharp green bill. "Those are fine, Louis, and you have enough now," called Mrs. Loon to her husband, as she poked the sticks into place with her bill. "All right, Louisa," answered Mr. Loon, "and now for some of those nice cattails over yonder."

THEN they each took the head of a cattail and pecked and pulled away at it until it looked and felt like soft feathers. This was the lining for the nest. Some birds would laugh at the idea of calling that hole in the sand a nest, but Mr. and Mrs. Loon do the best they can. You see they are very clever about flying and swimming, but they can't walk a bit well, and so they make their nest as near the water as possible.

AS soon as the nest was done, Mr. Loon got into the water with a shrill cry of relief to think that job was done. "Try it, Louisa," he shrieked, "I do hope it's comfortable, my dear." Mrs. Loon settled herself in her nest and gave a laugh. "It's the best one we ever built," she trilled contentedly. In a few days, if you had looked into that nest, you would have seen two greenish brown eggs, spotted with dark brown. They were bigger than hen's eggs, and Mrs. Louisa Loon was very proud of them. One day, saucy young Sammy Snake discovered them. He was just going to have a nice meal when Mrs. Loon returned from her morning exercise. Oh, didn't she scream and scold! Young Sammy only winked at her and said, "Well, madam, I don't think they're pretty eggs, anyhow, such a horrid brown color. I'm sure I don't want them." "Horrid brown color, indeed," said Mrs. Loon, "just you wait until next week and see what you'll see!"

ONE fine day soon after this, Sammy heard a great screeching and calling, so he hurried to the waters edge to see what all the excitement was about. There he saw Mr. and Mrs. Loon giving two baby loons their first swimming lesson. Such a commotion! But how quickly those Loon children learned to swim! Soon they were off for a trip up the lake, father and mother swimming on the outside, and the two young ones swimming between them where they were safe from harm.

"NOW, Millie and Willie," said old Grandsire Loon to his two grandchildren one day, "I am going to tell you something very important." "Yes, sir," said Millie and Willie very respectfully. "Now, my dears," continued Grandsire, "if you ever see any human beings around this lake there are two things you must remember to do. First, call to me as loudly as ever you can. Second, dive and swim under water until you are as far away as Little Island is from Big Island."

"BUT, Granddaddy, how are we to know what they are when we see them?" asked Willie and Millie in chorus. "Well, my chicks," replied Grandsire, "it's easy enough. There's nothing else like them. They walk on two legs and they have two queer things called 'arms' instead of wings, which hang at their sides. The poor creatures can neither fly nor swim." "Then, how can

they harm us, Granddaddy," asked the two young loons. "Because they carry things called 'guns.' These look like nothing but a stick of wood. But the things make a frightful noise and a cloud of smoke. If you don't get out of sight quickly, a small round ball will hit you. It hurts too, and sometimes it kills." "Oh, dear," said Millie and Willie, "we'll surely be careful Grandsire."

NOW, one pleasant day in July, Millie and Willie were having a race to Hemlock Point. They were each so very much interested in trying to win that they forgot all about their grandfather's advice. "I'm lots ahead of you," called Willie, "my feet are touching the sand.. Oh, dear, what a queer looking bird. Come here, Millie." And there, not far away was the strangest looking object they had ever seen. It was swimming near and nearer.

"LOOK," said Willie, "it has yellow down on its head and blue eyes and a funny flat red bill—oh, Millie, what a strange bird." "Be quiet," whispered Millie, "you don't want to scare him away. He may be a good play-mate for us." Just then the stranger caught sight of them. He turned around and swam away just as fast as he could. But Willie swam after him and called "Please come back and play with us—oh please do." And the strange creature turned around and swam back with Willie to where Millie was



THE NEST OF A LOON

SOON they were friends and were racing to Big Island and back. The young Loons were the faster swimmers and the better divers, but they couldn't float on their backs the way the stranger could. They had such a jolly time together. After a while, Millie thought of something. "What is your name?" she asked shyly. "Bennie," replied the stranger, "and I live in that tent up there on Clover Hill. All of us Boy Scouts are camping out here for a whole month." "Do you fly 'way up there every night?" asked Willie. "Fly?" said Bennie, "Well, well, do you thing I'm an airplane or a bird? I can't fly." "Oh you poor thing," cried the little Loons, and they looked as if they were really sorry for their new friend. "But, of course, you'll learn to fly sometime," said Willie very politely, "it took Millie and me days and days to learn to fly over Blacktop yonder.

BUT Bennie only shook his head and two big tears started down his cheeks. "I can't ever learn to fly," he said, "because I haven't anything to use for wings." At this, Millie and Willie both began to cry for they felt so sorry for their friend. Altogether, they were very gloomy and unhappy for a few minutes. But very soon, indeed, Bennie grew tired of feeling sorry for himself. You see, he really was a cheerful little boy and was usually quite ready to make the best of a bad bargain.

"ANYWAY, I don't care," he said with a grin that showed all his white teeth, "I can run faster than any other Scout in the Troop." "O-O-Oh!" wailed the little Loons, and they both cried harder than ever. "What ever is the trouble now?" said Bennie, quite out of patience. "Please stop crying. I don't care, really, because I can't fly." "Boo-hoo-hoo," wept the little ones, "we can't run at all; we can only waddle, oh, boo-hoo-hoo."

AND then Bennie felt so sorry for them that he cried some more too. But in a minute he thought of something which made him feel more cheerful. "Why look here," he said, "we can help each other. I've thought of a wonderful plan. Some day we'll take a long trip—just the three of us. You two can fly and carry me until you are tired, and then I can run and carry you. Oho! what fun." "Yes, yes," said Millie and Willie, "let's go to Silver Lake and spend the day with Uncle Larry—do let's go soon—oho! what fun!" and they quite forgot to cry.

AFTER this these three had many good times together, but one day Willie happened to think of something. "Bennie," he said, "what kind of a bird are you, anyway?" At this Bennie laughed and laughed and laughed. Finally he stopped laughing enough to say, "I'm not a bird at all, Willie. I'm a human being." "But you can't be," piped up little Millie, "because you don't carry a gun." "Ho-ho-ho," laughed Bennie, "that's because I'm a Boy Scout—we don't go around killing things." "Well, well," said Willie, "that's the first mistake I ever knew Grandsire to make. Oh! what a joke on him." "Tee-hee-hee," giggled Millie, "do let's go and tell him right away. You come too, Bennie, so we can show Grandsire how nice some human beings are."

SO off they swam to find old Grandsire Loon and tell him the joke.

"WE MUST CHOOSE

AS AN example of the co-operation of the newspapers with the American Forestry Association in campaigning for a national forest policy the *Minneapolis Tribune* is entitled to a place in the front rank. The *Tribune* devoted a big editorial to the newsprint situation and on the same page printed the article by R. S. Kellogg, secretary of the Newsprint Service Bureau. Mr. Rome G. Brown then sent the page to every Associated Press newspaper in the United States. The article sent out by the Association on the forest situation in this country has been reprinted by many newspapers and much editorial comment based upon the figures. In an editorial the *Rochester Democrat and Chronicle* warns the country as to the need of a national forest policy, and recounts the work the Association is doing. The editorial concludes:

"Will America heed the message and carry on the work begun? Upon the answer to that question depends more than can be appreciated now. The nation which allows its forests to perish will itself fall into decay and be in danger of perishing. France was saved by her forests. The loss of her forests doomed China. Which of the two nations do we propose to emulate? Which fate do we choose, for we must choose?"

The editors of the country have taken up the work of the American Forestry Association in a whole-hearted manner from every side, the planting of memorial trees, "Roads of Remembrance" and a national forest policy. Indeed many of them point to the tree planting as the greatest opportunity for educating the individual to the bigger aspects of the situation. Some of the comment follows:

Binghamton Sun: A worthy campaign for planting of trees is being carried on by the American Forestry Association. The Association is appealing to motorists to help by planting memorial trees along the highways to beautify the roads. An appeal is also being made to school officials throughout the country to interest the school children in the project. The work of the Association deserves hearty support of every true American. Not only will the planting of trees make the country more beautiful, but it will add materially to the corporate wealth. The serious depletion of our forest preserves is an important factor in the present shortage of paper. By teaching the younger generation to love trees and appreciate their value, an educational work will be done that will ultimately result in an improved national forest policy, something that is badly needed. Now is a good time to start the work, and thereby add to the beauty of the city, and help the good work that the American Forestry Association is doing.

PLANT TREES

Joyce Kilmer wrote:

"Poems are made by fools like me,
But only God can make a tree."

That only Eternal Wisdom can create the seed from which the tree grows is true. Eternal Wisdom also creates the other seed grown in the brain that creates the poem.

"Only God can make a tree," but a man, or even a child, can PLANT it and have the satisfaction of leaving upon the earth proof of his existence.

Plant a few trees yourself this year if you live away from asphalt streets, encourage each child to plant one.

The Christian Endeavorers have promised to plant trees on all occasions. The American Forestry Association, of No. 1410 H street, N. W., Washington, D. C., will send information as to just how to plant a tree.

Plant a tree in honor of those you like and respect, living or dead. Plant a tree for the soldiers and sailors that lie under the ground. . .

Plant trees for yourself, for the benefit of those that are to come after you on earth. No man need leave the earth bare of all proof that he ever existed, for a few good trees planted now will be giving fruit, or shade, or both, years after you are gone.

The dweller in the city will ask, "How shall I plant a tree?. Would it grow in the backyard, that the sun never visits, or will it sprout through the asphalt, the cobblestones or the sidewalks?"

No, unfortunately, city dwellers cannot be tree planters, IN THE CITIES.

But all the more reason to help make the country more beautiful. Nearly everybody goes to the country, nearly everybody CAN GO.

Go and take your tree with you, find the place by the roadside, or on a high hill. Plant it and leave; go to see it next year. If you cannot be a tree owner, be a tree creator.—*New York Journal.*

Houston Post: The suggestion of Charles Lathrop Pack of the American Forestry Association that the Bankhead Highway be made a "Road of Remembrance," in honor of the late Senator John H. Bankhead of Alabama, is most appropriate, and is worthy of serious consideration by the Bankhead Highway Association. In these sections, in particular, the suggestion of Mr. Pack that memorial trees be planted along the road by the people should be received with cordiality, for the trees would add to the beauty of the route and serve the practical purpose of providing needed shade, as well as inspire all who travel the road with gratitude for its founders.

Denver News: In response to a senatorial request for information in regard to the depletion of the forests, the American Forestry Association has presented figures to show that the New England States are no longer self-supporting in a lumber way; that the Lake States, once the greatest producers of lumber, are now importing lumber to keep alive the many wood using industries in that section; that the center of the lumber industry is fast moving to the Pacific Coast, which means long hauls and high freight rates; that the lumber people of the South say they will be through in fifteen or twenty years, so far as yellow pine is concerned.

Americans in France were much impressed by the destruction by the Germans of great national forests that had been protected by the French Government for hundreds of years, no cutting being allowed except under official auspices. The loss was so needless and so irrevocable that apart from the destruction of life it figured with observers from this side as one of the most lamentable features of the war. But the American Forestry Association shows that the forest fire loss in this country each year is about $28,000,000 and the area burned over is ten times greater every year than the devastated areas of France, yet when such fires are reported in the news columns as they occur, they create only the most passing interest. The Association would like greater protection for even private forests in order to prevent denudation of regions fit only for the growing of forest trees; hundreds of thousands of acres have been stripped of their growth, it is said, and left useless. Under protection trees are cut under official supervision only and no land is cleared.

It is time that all land owners should give heed to this rapid disappearance of forest trees and do their part, if it is only a little, to offset the scarcity. Few farms but have some corners, hills or ravines or other untillable ground, where trees might be the only crop. It is the selfish argument with some that the planter of a forest tree

FORESTS OR DEVASTATION"

does not live long enough to benefit by it.

This is not strictly true, but if it were, every man should be glad to do something for the next generation and perhaps he could do no better than to plant trees.

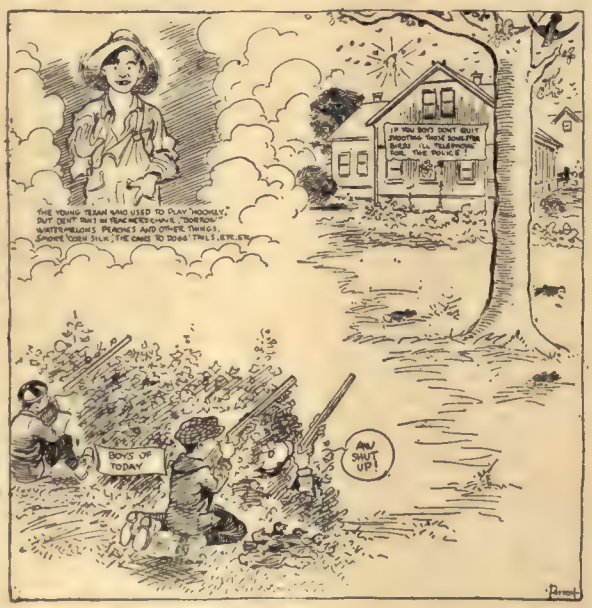
Baltimore Star: For economic reasons the American Forestry Association is endeavoring to arouse public sentiment in the interest of a national forest policy which it believes to be imperative at this time. The raw materials essential to a large share of industries come from our native forests, and figures cited by the AMERICAN FORESTRY Magazine indicate that 52,000 establishments engaged in manufacturing are depending solely or in part on the products of the forests for raw materials used in their varied lines of manufacture. The magnitude of the figures cited in the periodical to which we refer makes their acceptance a matter of difficulty. It behooves us to realize, however, that in spite of the propaganda which would convince us that trees are being planted in every section of the country, the fact remains that old forests are being destroyed very much more rapidly than new ones are planted. America is the only country which does not give legislative protection to her forests, and the result is wanton deforestation in many sections of the country. The scarcity and expensiveness of newsprint alone are facts palpable enough to convince us of the need for a national forestry policy. The life of a tree is a matter of no small moment and it will be a fortunate day for America when her citizens awaken to this fact.

Brattleboro Reformer: In its gift of trees to Europe the American Forestry Association could not bestow a finer gift for use in those ravaged countries than the sugar maple. Its autumn coloring is world famous, its leaves a great fertilizer and its wood is probably used in utilitarian products more than any other. The more maples included in the gift the better.

Little Rock Democrat: Acuteness of the present newsprint paper situation in this country is emphasizing more strongly than ever the necessity for a broad policy of national reforestation, particularly in the case of pulp wood lands. The present shortage of paper, its unprecedented cost and the prospect, within a comparatively few years, of an actual failure of supply, has awakened the nation, as nothing has ever done, to the truth of the propaganda started years ago by the American Forestry Association of Washington, D. C. Clearly it is up to the Congress to outline and provide a comprehensive plan for the United States Forest Service, through which the future supply of lumber and paper in this country may be assured.

Berkeley Gazette: A Hall of Fame for trees is being compiled by the American Forestry Association. In it are to be enrolled all the great trees from east to west, from north to south, around which and in whose shade American history has been centered. The people of this country, sprung so lately from pioneers, should delight in this Blue Book of Trees. It should prove not only vaulable and interesting from an historical point of view, but should stimulate in the hearts of its readers, a greater love and reverence for trees themselves.

"AN' PEEPUL USTER THINK I WUZ BAD!"



Patton, in the Dallas Journal.

Successful Farming: The American Forestry Association is doing a good work in popularizing memorial trees along our highways in remembrance of our fallen heroes. Nothing was so impressive to the Yanks as the splendid tree-lined highways of France. They were properly set and properly cared for. Their shade was a benefaction to the traveler and also a great benefit to the highways, keeping them from being too wet and too dry.

If the practice should prevail in this country it should begin as soon as a highway becomes permanently established and graded. Only those trees should be planted which the foresters know to be suitable for each stretch of road. It is evident that a road that goes through low, wet places and over high hills will require different kinds of trees if permanency is desired. These trees should be under the care of the State forestry department. What can be more suitable than splendid, shady highways as a memorial to our boys who fell?

Savannah News: There is a fine significance in the news from Washington that the president of the American Forestry Association has suggested that along the proposed Bankhead Highway, which has been for some time a reality, stretching from Washington City to San Francisco, be planted memorial trees—that continent-long stretch of living, growing attractive trees to be the monument to the last member of the Confederate army to sit in the upper House of the Congress of the United States. Trees lining notable highways have a beautiful sentiment attached to them and the practical values will be increasing as the living monuments stand and grow and by example occasion more systematic reforestation in many sections of the country.

Detroit News: Emulation in memorial tree planting is fostered by the American Forestry Association, which has a plan to register on a national honor roll the names of all trees planted as monuments. For local beautification and as a patriotic incentive such a scheme is wholly to be commended, and its carrying out on a more pretentious scale might achieve really practical results in forestry. There are names in American history more fittingly commemorated by a forest than by a tree. Nor can it longer be objected that forests must be remote and unvisited. Automobile tourists are counted upon as a reliable source of profit for most out-of-the-way places, and their revenues might easily suffice for the maintenance of forests if thought were given to making scenic regions accessible. How much better that the thousands who annually tour through the upper parts of Michigan should be inspired by the majesty of stately forests than depressed by the continuous sight of wreckage which the greed of men left as the sole memorial of the State's former natural wealth.

New Bedford Standard: Tree-planting is in the air in Massachusetts. It is almost a case of everybody's doing it. A householder need not be shy of starting the movement in his block or his street. It will be good public service.

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At the rate of any 15 for $1.00, any 100 for $5.00 the following: ALL the ordinary hardy herbaceous perennials in good strong plants such as canterbury bells, foxgloves, lobelias, iris (all kinds), rudbeckias, achilleas, helianthus, delphiniums, aquilegias, hollyhocks, dianthus, barbatus or sweet williams, phalaris and all other herbaceous subjects; also NEARLY ALL BEDDING PLANTS such as SALVIAS, VERBENAS, COLEUS in all colors, ageratum, phlox, petunias, lobelias, ice pinks, liberty ivies, vinca vines, thunbergias, heliotropes and other bedders.

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TREES TO BEAUTIFY DALLAS, TEXAS

A DEFINITE movement for the beautification of Dallas, Texas, through the planting of trees, shrubs and flowers has been instituted by the Tree, Shrub and Flower Planting Committee of the Metropolitan Development Association of that city. The remarkable opportunities which present themselves to property owners for the beautification of their streets and the enhancement of property values have been stressed at meetings of this committee. It is expected that the movement will become city-wide, and that within a short time property owners will be joining with each other in a systematic effort to increase the attractiveness of their particular sections of the city.

How quick results may be obtained, with a small expenditure of money, have been repeatedly stressed by Alfred MacDonald, city forester, who has announced that one of the 1920 aims of the City Forestry Department will be the creation of a municipal nursery where trees can be grown, to be transplanted later to the streets of the city.

"In order to insure better tree planting in Dallas," says Mr. MacDonald, "the City Forestry Department is arranging for the planting of shade trees at cost for property owners who desire them. When the Forestry Department plants such trees we give them special care, without further expense to the property owners, for a period of two years. The cost of such work is $2.50 for each tree planted. The department prunes, trims and cuts all trees in the parking spaces and within the limits of the highway without expense to the owner of the property.

"Trees growing naturally in the forest are protected from winds and storms by other trees; they are protected from insect attacks by birds and natural enemies of insects. But trees on a city street have none of this protection. Their roots suffer from lack of moisture which cannot penetrate the hard pavements surrounding their trunks. Insects feed upon them without interruption, and trees on a city street are at the mercy of the elements. So it is that of probably more than 200 kinds of trees which grow in this section only a comparatively few are adapted to planting in a city.

"Among the best trees for street planting are American elm, sycamore, hackberry, black locust, honey locust and pin oak.

"Cottonwood, box elder and ash should not be planted in Dallas, and especially should not be planted on a city street because of their susceptibility to insect attack.

"There are probably 30,000 trees on the streets of Dallas and there should be 150,000. Ten thousand trees a year should be planted in the city. If intelligent tree planting can be promoted, and if we can have sufficient funds to give the shade trees the care they need, we can in a few years make the street of Dallas cool, leafy tunnels arched by living walls."

ANESTHETICS FOR TREES

THE theory that trees should be treated with anesthetics to enable them to withstand the shock of transplanting has been advanced by Sir Jagadish Chandra Bose, an Indian scientist, says an Associated Press dispatch from London. Sir Jagadish showed photographs of large trees which he had successfully transplanted in Calcutta in spite of their age. Realizing, he explained, that the difficulty of successful transplantation lay in the shock of removal, and that nerve effects in plants and animals were on similar lines, he treated these trees with anesthetics and they bore the uprooting and removal well.

The tribute of William Turner to Davey Tree Surgery



View of Bertram H. Borden estate, The Riverlands, Oceanic, N. J. William Turner is superintendent of this estate



The Riverlands, Oceanic, N. J.

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Yours truly, Wm. Turner, *Supt.*

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

THE Department of Lands and Forests of the Province of Quebec has decided to withdraw the permission heretofore accorded to cut "black spruce" under twelve inches, the legal limit for white spruce, cedar, maple and jack pine. Red spruce is included under the head of black spruce or white spruce according as it grows on swampy land or on high land, or according to the view of the inspector. The two species are so much alike that it is very difficult to tell the difference. The regulations will be more rigidly enforced in the future. In referring to diameters, for the purpose of the regulations the diameter is at a point "two feet from the soil." In the past a certain number of trees cut under size have been charged for at the rate of two dollars per tree, but as the lumbering operations have pushed farther north into smaller timber, so much has been cut under size that the Department has decided to enforce the regulations and has made an inspection during the past summer which showed so many violations that they decided to charge in fines at the rate of one dollar per tree. At this rate the fines in the St. Maurice Valley already amount to $50,000, with more to come. On some areas examined, if the regulations had been followed, only four trees per acre would have been cut, an impossibility for profitable logging. If the regulations are enforced and the undersized material is not worth the amount of the fines, the result will be a decided curtailment of the cut which will be quite a hardship to some operators and a constant source of irritation for them and trouble for the Government. The Department says, however, that if applications to log on particular areas are received in the spring, it will inspect the territories and if it seems wise to allow undersized cutting, from a silvicultural standpoint, they will give permission. This would certainly be a good thing for the forests if carefully carried out, but the Government has not a large enough staff to supervise this work, and it opens up opportunities for dishonest operators to bribe Government inspectors, which are not pleasant to contemplate. In the past, when most of the cutting was done on contract, operators had trouble with scalers who were bribed by the contractors to make false returns, and it is certainly wiser to prevent opportunities of this kind, wherever possible. The only feasible way is for the Government and the operators to employ technical men in their inspections and in charge of their woods operations. License holders should make out cutting plans for a few years in advance, these should be approved by the Government and the operators should be required to have experienced technical men to carry out the work, who should be held strictly accountable for fulfilling the requirements of the plans. The pulp and paper industry has grown to such an extent and is such a source of revenue to the Province that everything possible should be done to foster it and to PUT IT ON A PERMANENT BASIS. If mills are permitted to work against their own best interests and to use up all their raw materials in a comparatively few years, their closing down would be a great calamity, even though they had paid back their investors many times over. Keeping them going is vital to the prosperity of the country.

The Technical Section of the Canadian Pulp and Paper Association will be the guest of the Spanish River Pulp and Paper Company at Sault St. Marie during the week of June 21. The mills of the company will be visited and also several plants of the neighborhood.

The various companies in the Association have agreed to take into their mills during the summer 63 students who are interested in studies connected with the pulp and paper industry.

The Council of the Technical Section has passed a resolution recommending that the Association take over the Dominion Government Forest Products Laboratory, established some years ago at McGill University in Montreal, and operate it for the investigation of fundamental problems of interest to the industry and for a general bureau of information. The laboratory has become moribund through the gradual loss of its staff, owing to the ridiculously small salaries which were paid.

All arrangements have been made by the Board of Railway Commissioners for the patrol of railway rights of way for the protection of the forests from fire for the summer. The plans are well thought out and are based on the experience of past years. It has been found that motor speeder patrol is cheaper than patrol of sections (in the railway sense), but that the latter is more efficient. This is the experience of the C. P. R. Department of National Resources. The St. Maurice Forest Protective Association has not had the same experience.

Mr. James White, of the Commission of Conservation, read a very interesting and able paper before the Rotary Club of Ottawa on the forest resources of the

100,000,000 Feet

National Forest Timber

FOR SALE

Location and amount.—All the merchantable dead timber standing or down and all the live timber marked or designated for cutting on two areas embracing about 10,000 acres on Port Snettisham and Glass Peninsula, Tongass National Forest, Alaska, estimated to be 100,000,000 feet B. M., more or less, of Sitka spruce, western red cedar, Alaska cypress, western hemlock, and other species, approximately 65% western hemlock.

Stumpage Prices.—Lowest rates considered, $1.00 per M for Sitka spruce, western red cedar and Alaska cypress and $.50 per M. for western hemlock and other species. Rates to be readjusted every five years.

Deposit.—Two thousand dollars must be deposited with each bid to be applied on the purchase price, refunded or retained in part as liquidated damages according to conditions of sale.

Final Date for Bids.—Sealed bids will be received by the District Forester, Portland, Oregon, up to and including June 1, 1920. The time may be extended thirty days upon request from parties having legitimate interest.

The right to reject any and all bids is reserved. Before bids are submitted, full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, Portland, Oregon, or the Forest Supervisor, Ketchikan, Alaska.



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Province of Quebec, with especial reference to the pulp wood supply. He estimates that the supply at the probable rate of consumption which we will have in the future will only last for fifty years.

The Spanish River Pulp and Paper Company will probably have an aviation department soon. They have engaged an aviator and are making their plans.

Price Brothers Company have shipped one Martynside seaplane from England and have ordered another and should be able to begin work very soon. The Laurentide Company has assembled its planes and will test out in the air in a few days.

Regular flying was begun early in May.

Mr. John D. Gilmour, forester and woods manager for the Anglo-Newfoundland Development Company, is visiting Montreal. He reports a very severe winter with seven feet of snow.

Experiments with wireless telephones are being carried out on a commercial scale in the St. Maurice District but so far have not proved successful. They are being watched with great interest and it is hoped that they will ultimately prove successful. Experiments are also under way between Vancouver and Vancouver Island. When the wireless telephone works properly it is much clearer and more distinct than a land line.

MIGRATORY BIRD LAW UPHELD

THE migratory bird act of 1918, designed to carry out provisions of a treaty between this country and Great Britain for the protection of migratory birds, has been held constitutional by the Supreme Court at Washington.

Justice Holmes, in rendering the majority opinion, declared that "a national interest of very nearly the first magnitude" was involved, and that, except for the treaty and the statute, there soon might be no birds for any power to deal with.

"We see nothing in the Constitution that compels the Government to sit by while a food supply is cut off and the protectors of 'our forests and our crops are destroyed,'" Justice Holmes said.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

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*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

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EDWARD F. BIGELOW, Managing Editor

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A LUMBERMAN'S SUGGESTIONS

D. F. CLARK, of McOsborne and Clark Lumber Company, of Minneapolis, Minnesota, a member of the American Forestry Association writes:

"I am very much interested in reforestation, and every element that enters into forestry, as I think the time has come when every man, whether he is a lumberman or not, should take a great interest in conserving our forests and woods. I am very much in favor of changing the thicknesses of hardwood lumber, and establishing the custom and practice of using thinner woods in practically every place where inch wood is used.

"The pine men have preserved the forests by establishing the grade on a thinner basis, and the time is here when hardwood should also be established along these lines. Our desks and chairs, floors and everything that does not require strength could be reduced a large percentage, and yet be suitable for the purpose, and it is a great saving to our hardwood. I have advocated this in several places, trying to get the people of Minnesota interested. My experience in selling hardwood to manual training departments is that they insist upon having absolutely clear lumber. They teach the child to make the things, but the child has no conception whatever of the way the wood grows, or the grades which the tree produces. Many of the teachers and children do not know the different kinds of wood, and it would be surprising indeed to learn how few out of 100,000,000. of our countrymen know the kinds of trees, or the kind of wood after the tree is manufactured into lumber.

"I am very much enthused in agitating these matters, as well as matters relating to reforestation and conserving, saving and protecting our forests."

FUTURE TIMBER CROPS

GROWING future timber crops must be largely, though by no means wholly, a Government and State function," said E. T. Allen, Forester, in discussing the leading Forest Policy proposals at the Second American Lumber Congress and 18th Annual Meeting of the National Lumber Manufacturers Association which was held April 20 to 22, at Chicago.

Mr. Allen distinguished between local and national policies and the Congress passed a resolution to the effect that as most forest programs are largely local, local committees of the various regional associations should be appointed to confer with local forest authorities to determine the steps needful and to promote their adoption. An early declaration of principles in the light of what shall be determined is urged so that a wise and efficient policy may be developed looking to the perpetuation of forest supplies.

Dr. Hugh P. Baker, Secretary of the American Paper and Pulp Association, presented the forest policy promulgated by his association in a splendid talk.

BOWS OF YEW FOR MODERN ARCHERS

IT is a far cry from long-range rifles and high-powered explosives to the bow and arrow of the American Indian. Nevertheless, bows and arrows are still used by the small boy, albeit not without sorrow to the neighbor's chickens. There is also a demand for stronger and more expensive bows for archers of mature years. Doubtless these facts account for a recent sale, on the Snoqualmie National Forest in Washington, of a quantity of yew, to be used in making bows. Although the Forest Service of the United States Department of Agriculture sells a variety of forest products for unusual uses, this is probably the first case in which the final product is to be one of the oldest and most common weapons known to the world.

The yew has long been known as the best of all bow woods. Famous English archers would have no other. Richard III ordered bowyers to make four bows of witch-hazel, ash, or elm to every one of yew, in order that the supply of this valued wood might be preserved. This is said to be one of the earliest forest regulations in England. The staves from which bows were made in those early days were seasoned for three years before being made into bows and the bows were not used for two years after being completed.

The American yew is botanically very similar to the European yew. One of the three species in the United States grows only in Florida and is a small tree. Another is a shrub growing in the north Atlantic region, while the third occurs in th forests of the Pacific coast. It is the latter that grows in the Snoqualmie National Forest. When mature it usually is from 20 to 30 feet high and from 6 to 12 inches in diameter.

On account of its elasticity and strength the Indians of the Northwest utilized the wood of the yew for their bows and ofte for canoe paddles. Yew wood is also well adapted to carving and numerous attractive articles can be made from it. Not only does the grain of the wood make it possible to carve attractive designs, but the combination of red bark, white sapwood, and rose-red heartwood make especially pleasing effects possible.

FARMERS SHOULD OBSERVE "WOODLOT DAY"

A "WOODLOT DAY" should be established for general observance by Pennsylvania farmers. It could be a day in the spring as soon as conditions permit, when small trees can be planted in the woodlot, or tree seeds sown, according to Professor J. A. Ferguson, of the Forestry Department at the Pennsylvania State College.

"Just as Arbor Days are observed by the towns people, so should the farmers have a Woodlot Day, by official proclamation, if necessary," he says. From the forestry standpoint, a farmer is a man who year after year cuts trees out of the woodlot and never plants any to take their places. The process can have but one ending, the gradual thinning out of trees and the final loss of one of the most valuable farm assets. For every tree that is cut out, a dozen small trees should be planted.

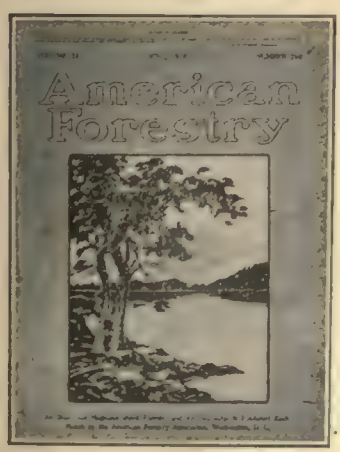
A hundred little one-year-old hardwood trees will not cost much to purchase. They can often be dug up under trees growi in the open, or thinned out from spots where they are growing too thickly. They can often be obtained free of charge from the Pennsylvania State Forestry Department at Harrisburg. A hundred or more of these trees planted each year on "Woodlot Day" will keep the woodlot well stocked and insure the future supply of a rapidly decreasing commodity. They are the children of the woodlot and there can be no future without them.

Under the trees in the spring of the year will be found many seeds that have been stratified naturally under the snow. They can be gathered and planted at once. Many need no more attention than placement in a hole made with a small stick with the earth firmed over with the foot. For small seeds a seed spot should be made, the grass and weeds stripped off for a foot and the seeds planted as any garden seed. Establish a "Woodlot Day" on the farm.

BECOME A MEMBER

Any person may become a member of the American Forestry Association upon application and payment of dues.

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SALE OF TIMBER
MESCALERO INDIAN RESERVATION
NOGAL UNIT

SEALED bids in duplicate, marked outside "Bid Nogal Timber Unit" and addressed to Superintendent Mescalero Indian School, Mescalero, New Mexico, will be received until twelve o'clock noon, Mountain Time, Tuesday, July 20, 1920, for the purchase of timber on a tract comprising the Nogal drainage area on the southwestern portion of the Mescalero Indian Reservation and situated within Townships 13 and 14 South, Range 13 E., New Mexico Meridian. The said unit comprises about 9,000 acres with an estimated stand of over 50,000,000 feet, chiefly Douglas fir and western yellow pine. Each bid must state the price per thousand feet, Scribner Decimal scale, that will be paid for timber cut and scaled prior to April, 1925. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs, by three-year periods. No bid of less than three dollars ($3.00) per M. feet for yellow pine and Douglas fir, two dollars ($2.00) per M. for Mexican white pine and Engelmann spruce and one dollar ($1 00) per M. for white fir during the period ending March 31, 1925, will be considered. Each bid must be accompanied by a certified check on a solvent national bank, payable to the said Superintendent in the amount of six thousand dollars ($6,000). The deposit will be returned if a bid is rejected, but retained as liquidated damages, if the required contract and bond for $15,000,000 are not executed and presented for approval within sixty days from the acceptance of a bid. The right to reject any and all bids is reserved. Copies of the bid and contract forms and other information may be obtained from the Superintendent, Indian School, Mescalero, New Mexico.

Washington, D. C., May 10, 1920.

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STATE NEWS

MASSACHUSETTS

THE Committee on Agriculture, of Massachusetts, in executive session recently voted to report a bill to permit the county commissioners to raise such sums as they may judge expedient in their several counties for the purpose of giving aid to their county farm bureaus.

The committee also voted to report the bill on the initiative petition that the State Forest Commission be authorized to buy 20,000 acres in the State for the purpose of producing timber and protecting the water supply. There goes with this, as a part of the subject, a favorable report on the petition of George H. Graham, former member of the old board of fisheries and game, for authorization of the State Forest Commission to buy 250,000 acres. The Graham bill has five sections, three of which are reported. It provides for the purchase within 10 years, at not more than the present authorized price, or such price as the Legislature may fix, the State Commission to be authorized to open the whole or any portion of the lands to public fishing and shooting.

NEW JERSEY

A SURVEY of the progress of forestry in New Jersey, conducted by the State Forester during the past winter to determine the extent that woodland owners have actively engaged in forestry practice, has shown most gratifying results. Since the State of New Jersey owns less than one per cent of the forests within her borders, it has been the policy of the State Forester to support and encourage the interest of private owners in the practice of forestry, and in this way serve the public interest. Many owners who have taken advantage of this aid, have found forest planting and woodland management both practicable and profitable.

The replies received to questionnaires sent to all persons who have indicated an interest in forestry in the past, show that 114 active co-operators, including 11 municipalities and public institutions, have practiced intensive forestry methods, including fire protection, improvement cutting, close utilization of products, etc.—on approximately 10,000 acres of woodland, while 40,000 acres more under the same ownership have been protected and improved to some extent, and definite plans have been made for more intensive management. The same co-operators, together with 41 others who are at present inactive, are planning to extend forestry management to more than 12,000 acres of woodland that have received no attention up to this time.

Progress has also been made in forest planting. While natural reproduction is usually adequate and satisfactory in many parts of the State, it is often necessary to re-establish forest growth by planting on land unwisely cleared and unfit for agriculture, or where all reproduction has been destroyed by fire. More than 1600 acres have been reproduced by persons co-operating with the State Forester, and nearly 300 acres more will be planted within a short time.

Believing that number of State Forests are valuable as a public demonstration of the methods and results of forestry practice, the State has acquired six State Forests with a total area of 16,591 acres of woodland, managed by the State Forester. Upon these lands 50 acres of forest plantations have been made, for the purpose of experiment and demonstration.

Altogether there are 80,000 acres within the State, approximately 4 per cent of the State's total woodland area, upon which forestry practice is now established or definitely planned for in the immediate future. The owners have been won over to the realization of the importance and practicability of forestry methods and are pledged to its practice.

The progress indicated in this survey is encouraging when it is realized that this work was commenced less than 15 years ago, but the accomplishment seems insignificant when we consider what yet remains to be done. New Jersey has nearly 2,000,000 acres of woodland, most of which is in a run-down condition because of repeated forest fires, wasteful logging, neglect of owners and abuse by the public. Nearly three-quarters of this area is unfit for any profitable use other than growing timber. New Jersey's problem is to return this vast area of semi-waste land to productiveness, and this can be done only by preventing and controlling forest fires and by applying practicable forestry management to the woodlands. When protection and management become established, the value of New Jersey's woodlands will be increased from less than $6,000,000 to over $200,000,000. Instead of furnishing less than one-tenth of the lumber used within the State, as at present, New Jersey's woodlands are capable of supplying a very great portion of the lumber and wood consumed within her borders. It is needless to point out the benefits to land owners, producers and consumers that will result.

Plant Memorial Trees

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SOUTHERN PINE ASSOCIATION
NEW ORLEANS, LA.

National Forest Timber For Sale

The Forest Service invites investigation of an opportunity for securing raw material for a tannic acid plant on or near the Nantahala National Forest, North Carolina. The estimated volume of chestnut acidwood, which will be advertised for sale on application from a responsible prospective bidder, is approximately 150,000 cords, on the National Forest. There is an additional amount of approximately 200,000 cords on adjacent private land. The total is sufficient to supply an extract plant of efficient size for 25 years. Favorable topography will facilitate logging. For detailed information in regard to this opportunity, including the terms under which the National Forest stumpage will be advertised for sale to the highest bidder, application should be made to the

Forest Supervisor

Franklin, North Carolina

INDIAN FORESTER HERE

MR. CHARLES GILBERT ROGERS, F. C. H., F. L. S., C. I. E., who has been in the Imperial Indian Forest Service for thirty-two years, including seven years as Professor at the Dehra Dun Forest School and seven years as Chief Conservator in the Forests of Burma, is now spending from twelve to fifteen months in this country, with a party of sixteen English Engineers, preparatory to their work in India. Their work will consist largely of practical training in logging and sawmill work and about wood-working operations. All of these men have been trained as mechanical or civil engineers in England and all have been through the great World's War, mostly in the Royal Engineers. They have recently been appointed Forest Engineers to the Imperial Government of India, to form a nucleus of a Forest Engineering Branch of the Indian Service, and immediately after arrival in New York, about the middle of April, they went to several large skidder and cableway logging operations in the Southern Appalachian Mountains. A Forest Officer of Nigeria has joined the party to study logging conditions with a view to introducing American logging methods in Africa.

Mr. Rogers was the first graduate of the first English Forest School, established at Coopers Hill, England. This was in 1887. He was retired from the Imperial Indian Forest Service in February 1920, but was persuaded to take up this work especially for the Indian Service, on account of his thorough knowledge of conditions in India, as well as his familiarity with American conditions, having spent sometime in this country in 1906, going through the principal forest districts of this country and studying the methods of both private and national forestry.

Mr. Rogers and his party of students plan to spend sometime on the most important logging operations in the Southern Appalachian hardwood forests; the Southern pineries; the Lake States; the Inland Empire; the Douglas fir belt and the redwood and California pine sections. They will also visit several of the Forest Schools and the Madison Laboratory.

TIMBER HELPS POOR LANDS

TIMBER is essentially a poor land crop. Steep slopes, poor soil, rocky land, unusual corners, gullied and wooded tracts—all these afford opportunities for growing timber profitably, say specialists of the Forest Service, United States Department of Agriculture. A careful survey of the average farm will reveal a surprising number of spots of this sort which can be utilized to advantage. If they do not already have trees, planting them with the proper varieties will materially increase the value of the land.

SOIL-BUILDING POWER OF TREES

Certain kinds of trees, like the locust and the acacias, build up poor soil through the nitrogen-gathering bacteria in the root nodules, according to the Forest Service, United States Department of Agriculture. The soil-building power of trees on slopes is a fact which the farmer should not overlook. Steep lands, which have been cleared of timber at much expense, after being cultivated for a few years, often become gullied, and the rich lands adjoining are covered with deep deposits of sand. The surest and cheapest method of protecting such slopes is to maintain forests on them.

Small gullies can be stopped up by closely packed brush and tree tops, anchored by stakes if necessary. Large, open gullies are checked successfully only by planting over the entire gully basin, supplemented by low brush dams across the larger units of the gully.

EMPIRE STATE FOREST PRODUCTS ASSOCIATION

PROFESSOR A. B. RECKNAGEL, Secretary of the Empire State Forest Products Association, in an address on Forest Products Day at the New York State College of Forestry, said: "The object of any associated activity is the opportunity to do collectively what every member seeks to do individually. Thus the Empire State Forest Products Association seeks to protect, perpetuate, and increase the forest growth of the State. Its appeal to the forest industries is that they place themselves honestly and squarely on a broad, public-spirited, comprehensive policy which will result in the conservative use of one of the Nation's fundamental resources, the forest, and continued prosperity for the wood-using industries and hence consumers of New York State.

"Members of this Association control nearly a million and a half acres of forest land in the Adirondacks. They manufacture yearly more than a hundred million board feet of lumber, and over half a million tons of paper. Such a membership must adopt a rational, conservative forest policy, which will result in the perpetuity of their forest industries through wise use.

"The Association is actively concerned in the framing and passing of fair forest taxation measures, co-operative fire protection, the development of water power, and the formulation of a permanent timber policy for the State and Nation. The New York State College of Forestry co-operates very effectively with the Association in these matters, since its policy is to promote the fullest use of the forest resources consistent with their protection and development. The people of New York State will one day realize the sound economic basis of the Association's slogan of 'Protect, Increase, and Restore.'"

LUMBERMEN CONSERVING LUMBER

"LUMBERMEN generally are daily performing wonders in the way of conserving the present supply to its proper use, by striving to educate all users of lumber to purchase and use the particular grade adapted to their particular purpose. The lumberman, such as our company, which is using for the so-called novelties, only that lumber which is not suited to use in more expensive lines of manufacture, is a true conservationist."

This was the viewpoint of W. C. Hull, president of the Oval Wood Dish Company, of Tupper Lake, in an address on Forest Products Day of the Forest Week of the New York State College of Forestry at Syracuse.

"The most flagrant and openly apparent waste that has come under my observation in recent years is now being committed by the State of New York in permitting its valuable hardwood trees, particularly the beautiful birch, to wither away and die of old age, without having performed their duty to humanity. They are dying literally by thousands, and instead of serving any useful purpose, they become a menace to the balance of the timber. The price of one birch tree removed and converted into useful commodities would suffice to replant one thousand seedlings on some barren lands belonging to the State. Shall prejudice of city dwellers who make the forests their playground, and their refusal to post themselves as to the true situation forever cause this waste to continue?"

In discussing the use of wood for novelties, Mr. Hull said that the annual consumption of wooden dishes is about one billion, and of paper dishes, made from wood products is about two billion. The wooden dish industry uses from seventeen to twenty million feet of lumber a year. He said there has been no improvement in the making of clothes pins for forty years. The annual consumption is nearly 2,000,000 boxes, requiring 20,000,000 feet of lumber.

PROTECTING WOODLANDS FROM INJURY

THAT young growth in the woods, known popularly as "brush," is something to be rid of, is a prevalent but mistaken conception, since, as forestry specialists of the United States Department of Agriculture point out, a forest can not maintain itself long without reproduction. For the sake of getting a scattering of green grass in the spring, it is the short-sighted practice in hundreds of localities to fire the woods regularly. This results in killing thousands of small trees needed to continue the forest in the future and also injures a large amount of marketable timber. Furthermore, such burning destroys a large amount of rich vegetable fertilizer.

Cattle and hogs in hardwood stands and hogs in long-leaf pines keep the forest from being restocked. Damage from insects can be reduced by cutting timber at the proper time of year and by utilizing lightning-killed trees without delay, since they harbor destructive pests. Cattle destroy the productive leaf mulch which keeps the trees growing during long, dry spells. All large openings where light comes through into the forest should be filled with younger trees. Fully stocked woods contain little or no grass, but afford full shade, which prevents the soil drying out and keeps the trees growing.

DYNAMITE—THE SOIL REJUVENATOR

"A LANDSCAPE engineer has a great many queer problems presented to him by the owners of country estates," says Norman Suplee. "One put up to me a short time ago would have stumped me completely had I not been familiar with the use of dynamite.

"There were about five acres of land in the tract. In order to save the time that it would have taken to mow the grass, it had been burned off for a good many years, the result being that the humus in the topsoil had been almost completely destroyed. The drainage on the tract was also poor and the soil had become sour. The grass grew all over it in big clumps such as may be seen in swamp land. The new owner wanted a smooth lawn. I saw at once that the drainage would have to be corrected and that a way must be found to supply new plantfood for the sustenance of the surface growth.

"I first went over the entire tract and put down 1½-inch bore holes 18 inches deep and about 9 or 10 feet apart. A third of a stick of dynamite was tamped into each hole and fired. Then around the trees, bore holes were put down to a depth of 3 or 4 feet and about 10 feet apart out at the edge of the foliage line and similar charges exploded in these. I then blasted a number of small ditches which emptied into the little stream flowing at the base of the property.

"A year later an examination of the tract showed that no more deadwood had developed on the trees. The grass had ceased to grow in clumps, had lost its yellowish cast and had become a smooth deep green. Many of the old trees had put on as much as eight inches of new growth at the end of the branches and some old grapevines which had been injured by the burning of the grass yielded a crop for the first time in many years. The vegetable garden which had refused to grow anything previously, after being aerated by the blasting, had netted the owner $200 profit. The garden consisted of an acre and a half of ground. If landscape engineers would study the problem, they would find many ways of using dynamite to great advantage."

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference Address Box 600, Care American Forestry Magazine, Washington, D. C.

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C.

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

DISCHARGED SAILOR would like position as assistant forester or a permanent position as surveyor with some lumber company with a chance for advancement. Salary is of secondary consideration. Married, so would have to locate in some small town. Have had four years' practical experience in general forestry, and some tree surgery. Address Box 900, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C.

POSITIONS OPEN

MAN WANTED with technical training and practical experience sufficient to make him thoroughly competent as a developer of Park plans, and also Park Superintendent—both in road construction, planting and landscape work—and Director of Forestry Service upon the public streets and parks of the city. Address Box 910, American Forestry Magazine, Washington, D. C. (6-9-20)

WANTED—Man capable of Supervising Slack and Tight Barrel Plant; Purchase and Inspect Cooperage Stocks; Develop Boxes, Crates and other Packages for miscellaneous articles. State experience, salary wanted and references in first letter. Address Box 123, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C.

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FOREST SCHOOL NOTES

UNIVERSITY OF WASHINGTON COLLEGE OF FORESTRY AND LUMBERING

PREPARATION for the All-Engineers and Foresters "Open House," held April 22-24, has occupied the attention of the Forest Club, during the past quarter. The work of the Forest School and a graphic portrayal of the fields of logging and lumbering, forest products, and forestry was presented to the 18,000 visitors who attended the "Open House." A model forest under management with growing trees from the Forest Nursery representing the different age classes and miniature steam logging operations and sawmill in actual operation attracted considerable attention. A model paper and pulp mill was also being constructed. Forest products, wood preservation, timber testing, dendrology and wood technology exhibits were displayed. The "Open House" was abandoned during the period of the war, but the Foresters won the prize for the best exhibition at the last three held, and are making a diligent effort to repeat their success this year.

The Forest Club has had the opportunity of hearing some exceptional talks by a number of prominent authorities. At the meeting of February 17, Mr. R. L. Fromme, District Forest Inspector of Recreation and Game, told of the project of introducing Alaskan moose and mountain goats into the Olympic National Forest. Mr. Shirl Blalock, district office manager of the United States Bureau of Foreign and Domestic Commerce, spoke on lumber exporting, the evening of February 24. Mr. William M. Hall, of Hall-Kellogg, Chicago, who has an international reputation as a forester, spoke on the proposed forest land policy and its importance to the states of the Pacific Northwest.

Mr. S. W. Barker, premier motor truck logging authority on the Pacific Coast, gave a highly entertaining and instructive talk on motor truck logging. Motion pictures of Mr. Barker's operations near Lake Whatcom gave added interest to the address. Road construction, unloading, care of trucks, capital required and financing were discussed in detail.

Sufficient funds were raised in the College of Forestry and Lumbering itself to send R. M. Smith as a delegate to the Intercollegiate Association of Forest Clubs convention at New Haven. Mr. Smith carried proxy votes from the Forest Clubs at the University of Idaho, Montana and Minnesota.

The Short Course at the College of Forestry and Lumbering, held during the winter quarter, was attended by 22 men, most of them having considerable experience already in the lumbering industry and the Forest Service. Five Canadians were registered for the Short Course.

An 8-reel motion picture show given at one of the regular Forest Club meetings attracted wide-spread attention on the campus and many students from other departments were present. Accident prevention in logging camps and sawmills was the subject of the film, which was taken for the California Accident Insurance Commission. A film showing the manufacture of matches was also shown.

A number of responsible logging engineering positions have recently been taken by graduates of the school. George O'Brien, '18, has accepted the position of logging engineer with the Capilano Timber Company, at North Vancouver, British Columbia. J. W. Ottestad, '12, formerly with the C. O. Mengel Company, Axim, Gold Coast, South Africa, is now engineer for the Three Lakes Lumber Company, Three Lakes, Washington. Harry M. Lind, '19, is assistant engineer with the George Palmer Lumber Company, Vincent, Oregon. Ervin Rengstorff, '15, is logging engineer for the same company. Joseph G. G. Morgan, '13, has accepted a position as superintendent of construction for the K. & M. Logging Company, Independence, Washington. This camp was formerly operated by Wilson Brothers, of Aberdeen.

George Hutton, '15, has established a veneer mill at Olympia, Washington, to specialize in the production of veneers from alder, black cottonwood, hemlock, spruce and fir.

YALE FOREST SCHOOL

THERE never was a period since the organization of the School of Forestry at Yale when so many inquiries have been received from timberland owners and corporations regarding trained foresters. It has been our custom to secure summer positions for men who are in the progress of their professional training. This year for the first time not more than one-tenth of the positions available for summer work and at higher wages than ever before, can be filled. There are also a large number of inquiries for foresters completing their professional training and good positions are available for every man who wants to enter private work after the completion of his training.

The summer camp of the Yale School of Forestry will open at Milford, July 1, and will be in charge of Professor R. C. Hawley. Arrangements are made to enter students for the regular two year technical course, leading to the degree of Master of Forestry, and for a certain number of special students and for research students.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

JULY 1920 | CONTENTS | VOL. 26, NO. 319



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Beyond its great economic value, the arecanut palm is noted for its straight height and graceful beauty. It is fittingly called "an arrow from heaven" by the Hindu poets. (*See page* 409)

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CHANGE OF ADDRESS

A request for change of address must reach us at least thirty days before the date of the issue with which it is to take effect. Be sure to give the old address as well as the new one.

Members desiring to discontinue membership and magazine should file formal letter of resignation at least thirty days prior to expiration of membership.

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"HALL OF FAME" FOR TREES

Here is the oldest tree in Virginia and it is certainly entitled to a place in the Hall of Fame for trees. The nomination is made by Meade Ferguson, of Richmond. It stands in Charles City County, Virginia, and for age and size is perhaps not equalled by any on the Atlantic coast. This tree is the common Tulip or Yellow Poplar (Liriodendron tulipfera), a well known species found in the woods from Vermont to Florida. It measures twenty-seven and a half feet in circumference six feet from the ground. The base at the ground, however, is sixty feet in circumference. It is estimated to be more than five hundred years old, representing a generation of trees, which existed hundreds of years before Captain John Smith founded Jamestown, which is only a few miles from where the tree stands. Throughout Eastern Virginia it is known as the Octopus tree. Some hundreds of years ago the limbs were probably broken or bent by savages or wild animals so they have grown in the somewhat distorted shape of a fancied resemblance to an octopus. A great race of men who once held war councils around its roots have disappeared and been replaced by another race and by a new civilization. Strange wild beasts, which once lurked in its branches come no more and yet the old Octopus tree, a great piece of Nature's creation, stands as a mute reminder of the time before white men arrived in America.



THE OCTOPUS TREE

AMERICAN FORESTRY

VOL. XXVI JULY 1920 NO. 319

EDITORIAL

NOW IS THE TIME FOR ACTION

DEPLETION of the forests of the United States within 60 to 75 years with a resultant slump in all enterprise that depends wholly, or in part, on forest products can be averted if action is taken without further delay.

While at the present rate of cutting it is agreed that the forests of the United States are sufficient for only 60 to 75 years, it is pointed out by forestry experts that if private organizations adopt logging methods that will protect young growth and leave logged-off lands in condition for forest renewal, the young trees of today will be of merchantable size when needed. This is dependent on keeping fires out of the forests so that young trees will have an opportunity to grow.

Since it takes from 60 to 100 years to produce forest trees of commercial size, private owners of timber lands are not likely to be interested in forest reproduction as an investment. The relationship of timbered areas to future needs; their incentive to tourist travel; the fact that they serve as water reservoirs, etc., make the public vitally interested in seeing them continued and for this reason State and National acquirement of logged-off areas and protection of such areas against fire is proposed as the solution of the continued timber supply problem.

FOR PERPETUATION OF OUR FORESTS

DEMANDS for national and state legislation for the purpose of perpetuating our forests are made by the Forestry Committee of the American Paper and Pulp Association in a recent report. These demands are broad gauged, comprehensive and practical. They provide for:

1. Co-operation with States for forest protection, care and management and the distribution of forest planting material.

2. Classification of National Forest lands and co-operation with States in classification of private forest lands.

3. The continued acquisition of forest lands on the watersheds of navigable streams in New England, the Southern Appalachians and other suitable regions.

4. Enlarging the National Forests by exchange of timber for land.

5. Replanting devastated areas in the National Forests.

6. Continuous research and investigation in the utilization of forest resources and products.

7. The extension of the Federal Farm Loan Act to include loans for the purchase or improvement of cut-over or immature forest lands, or for holding, protecting and reforesting such lands.

It is expected that bills providing for the main features of the demands will be introduced in Congress at the next Session and that a vigorous effort will be made to secure adequate appropriations for putting the recommendations into effect.

FOREST FIRE PROTECTION IN PENNSYLVANIA

IT is not surprising that Pennsylvania, which shared with New York the leading position in timber production for 30 years and had by 1918 dropped to twentieth place, should become concerned about the protection of its remaining timber and the source of its future supply. One can read in the timber history of the State the too common story of destructive logging and extravagant waste, followed by recurrent fires. There remains but the shell of a resource capable under proper management of having met currently the ever increasing demands of the State for timber products. Pennsylvania's proud record as a lumber producing State is but a memory, the highest point in production having been reached in 1899, while the production of today is that of Civil War times. From a state of independence and ability to export timber, it has passed to one of dependence upon outside sources for material to meet its expanding industrial and domestic requirements.

In an effort to bring home to the citizens of the State its critical timber situation, Governor Sproul has issued

a forest fire proclamation, calling upon them to co-operate fully in the prevention and suppression of forest fires, the arch enemy of timber. The proclamation cites the tremendous loss, direct and indirect, to which the State is subject through this factor alone, a loss which can be readily avoided by care and public support, with the eventual recovery to production of the 12,000,000 acres of forest land in the State.

Pennsylvania has thus established a precedent worthy of adoption by all timber producing States. Could a more appropriate appeal to the people be made by an executive than for their support in stamping out the fire menace, the curse of the forests? The accomplishment of this object would go far toward the solution of our forest problems. In Pennsylvania, where natural reproduction under favorable conditions so generously follows cutting, it would constitute the first and most essential step toward enabling the State to redeem its responsibility in timber production.

THE FOREST PROBLEM

THEODORE ROOSEVELT'S remark that "The Forest Problem is in many ways the most vital internal problem of the American people today" may well be repeated and emphasized on every occasion.

No one can conceive that a man of Roosevelt's ardent patriotic nature would go out into the fields or the forests and carelessly set them afire; and yet many citizens who profess to be Americans do just this. Patriotism, should include pride in one's country's resources as well as consideration for its future welfare, love of country and its institutions, and pride in achievement and in progress. A man who burns a forest shows none of these attributes.

It has been said that "a man who destroys a forest is untrue to himself—careless of the rights of his brother men—blind to the demands of posterity—scornful of the law; careless of his nation's pride, prosperity and greatness, and oblivious to the teachings of the faith he professes!"

FOREST SERVICE APPROPRIATIONS FOR 1921

FOREST Service appropriations for the fiscal year 1921 as finally agreed to by both Houses of Congress and approved by the President, amount to $6,295,822. Careful study of the various items of appropriation does not indicate any very radical departures from the previous year. Some of the most striking include an increase of $50,000 in the appropriation for forest products investigations; a decrease of $28,728 in the appropriation for silvical and other forest investigations; a decrease of $25,000 in the appropriation for reforestation on the National Forests; a decrease of $50,000 in the appropriation for permanent improvements; an increase of $100,000 in the special appropriation for fire fighting; an increase of $25,000 in the item for co-operative fire protection with the States under the Weeks Law; and the introduction of a new item of $50,000 for air patrol on the National Forests. The changes in the appropriations for forest products and forest investigations are unfortunate and needless to say, the cuts in the appropriations for reforestation and permanent improvements on the National Forests will seriously handicap the effective prosecution of these two important lines of work.

Another serious handicap which is not quite so apparent as those already mentioned is a decrease of 22 in the number of statutory clerical positions at $900 a year. In an attempt to increase efficiency by paying salaries more nearly commensurate with the work performed, the Forest Service had suggested the dropping of 60 statutory clerical positions at $900 and the addition of 7 positions at $1,800, 7 at $1,600, and 20 at $1,500. The changes would have meant a net decrease in the appropriation for statutory salaries of $200. Congress accepted in part the proposed reduction in the number of $900 positions, and at the same time made no increases in the number of $1,800, $1,600 and $1,500 positions. Thus a reduction is made in the clerical force needed to handle the constantly growing business of the Forest Service, and the opportunity to make merited promotions and to increase efficiency by the payment of fair salaries is lost.

In the all important matter of fire-fighting, there is an increase of $100,000 in the emergency fire fund; the appropriation of $250,000 carried by this item does not, of course, indicate even approximately the total amount spent on fire protection. The great bulk of the expenditure for this purpose comes from other items providing for the employment of the regular forest force and for general expenses on the National Forests. While the increase in the special fund is to be welcomed as indicating some recognition by Congress of the importance of the fire problem, the amount actually appropriated is obviously too small to meet a real emergency. Should such an emergency arise, as it did in 1910, 1917, 1918 or 1919, the only recourse left to the Forest Service is to incur a deficiency. It would be much preferable from every standpoint to have the emergency fund sufficiently large to be really effective in meeting a crisis, which under unfavorable conditions is likely to occur at any time.

The addition of $25,000 to the appropriation for co-operative fire protection with the States under the Weeks Law marks real progress. It is only to be regretted that the addition was not larger. The Secretary of Agricul-

ture in his estimates had asked for $200,000 for this purpose, which was approved by the Senate. The House, however, cut the item to $75,000, which was finally raised in conference to the compromise sum of $125,000. This co-operative fire protection fund has proved an exceptionally effective means of stimulating State action and bringing about improved fire protection in the various co-operating States. No question exists as to the value of the work performed and the returns received upon investment. What is needed now is a larger appropriation of at least a million dollars and the removal of the present restriction limiting the use of the fund to forest lands on the watersheds of navigable streams.

Taking the Forest Service appropriation as a whole, the most noteworthy fact is that it has remained practically stationary for years. This means that with constantly increasing costs for labor and for supplies and equipment of all sorts, the work of National Forest administration is being carried on with practically no increase in funds. When the decreased purchasing power of the dollar is taken into consideration, the work of the National Forests is being conducted for approximately half what it was a few years ago in spite of a constantly increasing volume of work. To a considerable extent, this handicap has been passed on to individual employees in the form of relatively stationary and inadequate salaries, which have failed to increase at all proportionately to the increase in the cost of living. This situation cannot continue indefinitely. Increased appropriations along all lines are vital if the Forest Service is to retain its effectiveness and the public property included in the National Forests is to be efficiently administered.

KENTUCKY'S DISGRACE

THE great and sovereign State of Kentucky occupies the unique but unenviable position of having officially abandoned, by deliberate legislative enactment, the conservation of its forests. Once endowed by nature with a forest domain of unusual richness, variety, and magnitude, it had seen these forests dwindle in extent and diminish in value and importance during the last quarter of the nineteenth and the opening decade of the twentieth century. Then it bestirred itself. It did a splendid thing in a thorough-going and practical way. In the spring of 1912 it enacted as complete and adequate a forestry law as any in the country at that time. Moreover, it followed up that enactment by securing the services of an experienced and technically trained forester to make effective the forestry work the State had set out to do.

Now just eight years afterwards, lacking a day, we find written on the statute books these words:

"Be it enacted by the General Assembly of the Commonwealth of Kentucky: That * * * all laws now in force relating to * * * the State Board of Forestry * * * are hereby expressly repealed."

Inasmuch as practically all previous forestry legislation has centered around the State Board of Forestry, this sweeping provision effectively cripples the forest work of the State. Among other things the authority to organize and maintain a forest fire warden system appears to have been abolished. If this is so, the State has forfeited its right to co-operation with the Federal Forest Service in forest fire protection under the Weeks Law. Organized forest fire protection by the State thus becomes a thing of the past, and the development of forest work along other lines is abandoned.

In an apparent attempt to save its face and to ward off some of the criticism to which it knew its action would subject it, the Assembly adopted a last-minute amendment to the repeal bill providing for a State Forester under the Commissioner of Agriculture, Labor, and Statistics. The bill also carries a total appropriation of $6000 for forestry work, $3000 of which is for the salary of the State Forester. All property relating to forestry, such as maps, reports, forestry library, nursery stock, nursery utensils, and forest reserves (of which there are none), are turned over to the care of the Commissioner of Agriculture, who is to "take such steps as may be necessary or expedient for their preservation," in other words to provide for their safe keeping only.

These provisions add an ironical touch to the deathblow dealt by the Assembly to the forestry work of Kentucky. A going concern is abolished, and in its place is set up a dummy officially known as a State Forester—without authority and with a fund of $3000 to protect and develop the forest resources of a State with some nine million acres of wooded lands! One of the earliest pioneers in forestry south of the Mason and Dixon Line thus proclaims its lack of interest in one of its most important resources and sets a precedent which it is to be hoped no other State will follow.

It is difficult to believe that the action of the Assembly represents the real sentiment of the people of Kentucky. Petty partisan politics appear rather to be the cause of so reactionary a step. It is significant that the State Board of Forestry, which was created by a Democratic administration, should have been so promptly abolished by the Republicans on their accession to power some eight years later. No serious charges of inefficiency had been brought against either the Board of Forestry or the State Forester, and even had such charges been brought and substantiated, they would not have excused any such drastic and illogical action as that taken by the Assembly. Politics, as played in America, has given similar examples of "statesmanship" before, and offers a more reasonable explanation of unreasonable legislation. How long will the people sleep while the politicians play?

WAR MEMORIALS COUNCIL

THE American Forestry Association is named a member of the War Memorial Councils, just created by Newton D. Baker, the Secretary of War, which will have the work of marking and caring for the graves of the soldier dead in France, and for the beautification of the cemeteries in which they are placed. The plan is to establish "American Fields of Honor," according to Assistant Secretary Ralph Hayes, whose report was adopted following his return from France. The organizations composing the War Memorials Council are:

National Fine Arts Commission, The American Institute of Architects, The American Forestry Association, The Seven Affiliated Welfare Organizations, The American Legion, The Navy Department, The Quartermaster Corps (Cemeterial Division), The War Plans Division of the General Staff, Representatives from the families of soldier dead. Within the Council there is to be a Committee on Hostess House Service, consisting of delegates from the Welfare Organizations; and a Committee on Memorial and Decorative Art. The points in Mr. Hayes' report follow:

1. That Romagne, Belleau and Suresnes be the permanent American Fields of Honor in France.

2. That those bodies not requested to be returned be concentrated in the three locations named herein.

3. That the United States acquire perpetual rights for cemeterial purposes to a generous area (say 700x900 meters) about the Romagne cemeterial plot.

4. That the American Commission on Military Remains be dissolved, by reason of the completion of its work.

5. That headstones and markers be rigorously uniform and erected by the government; and that in the making of permanent plots there be no segregation into distinctive locations on the basis of rank.

6. That an advisory War Memorials Council be appointed, having representatives from the several interested organizations and having committees on hostess houses and commemorative art designs.

7. That the War Department procure the advice of the Committee on Commemorative Art of the War Memorials Council in matters concerning the design of statuary or structures to be erected overseas under the authority or with the collaboration of the department; and that the co-operation of this committee be available for these communities or societies wishing to consult it concerning the form of proposed war memorials.

This admirable suggestion on the part of Secretary Baker is in line with the Memorial Tree Planting and Roads of Remembrance ideas of the American Forestry Association that have been adopted everywhere. The possibilities for memorial highways and memorial tree planting in France should result in "American Fields of Honor," in which all citizens can take pride.



National Photo

FOR AMERICAN "FIELDS OF HONOR"

At the first meeting of the War Memorials Council, called by Newton D. Baker, the Secretary of War, the following attended: bottom row, left to right, Edward Down, Jr., the American Institute of Architects; Charles Lathrop Pack, President of the American Forestry Association; the Secretary of War; Bishop W. F. McDowell, the chairman; Col. Harry Cutler, Jewish Welfare Board; Col. C. C. Pierce, Graves Registration Division War Department; Franklin D. O'lier, Commander American Legion. Back of them stand W. R. Castle, State Department; Miss Marion Vincent, Young Women's Christian Association; Miss Virginia Oakley, American Field of Honor Association; James A. Flaherty, Knights of Columbus; Ralph Hayes, assistant to the Secretary of War. In the back row: Col. Edward J. Parker, Salvation Army; Father John J. Burke, National Catholic War Council; P. S. Ridsdale, Executive Secretary American Forestry Association; W. E. Bailey, American Field of Honor Association.

A CRISIS IN NATIONAL RECREATION

BY HENRY S. GRAVES

WIDESPREAD anxiety has been caused by the acute situation confronting the Government in its administration of the National Parks and other reservations which afford opportunities for recreation. The National Parks are threatened by proposals that would commercialize their natural resources. Already there are bills in Congress, well advanced toward passage, which would establish the precedent of industrial use of various resources in the Parks. There is no clear-cut policy regarding the relative functions of National Parks and National Forests, with the result that large transfers of land from the Forests to the Parks are advocated along lines that would jeopardize the whole system of National forestry. Conflicts have arisen as between the industrial and the recreation use of certain public properties. There is uncertainty regarding the real place of recreation in plans for road and trail development. The many federal activities in recreation are not adequately correlated. Friends of the recreation movement who look to the federal government for leadership and support of State and local effort are handicapped by the confusion of policies of the federal bureaus and deeply disturbed by the dangers to the National Parks created by the present legislative and administrative tendencies toward their commercialization.



A GLIMPSE OF GLACIER NATIONAL PARK

Our National Parks comprise some of the grandest mountain scenery in the world. These areas are dedicated to the use and enjoyment of all the people of the nation. Our country should not permit any encroachment upon them by private interests for the exploitation of natural resources. They should be kept intact in their primeval splendor.

It is only by the adoption of a sound national recreation policy that the public interests can be safeguarded. Such a policy should protect the integrity of the National Parks, should recognize the recreation functions of the National Forests and other permanent reservations, and should enable the Government, through its activities on the public properties and its co-operative and educational work outside, to take the leadership in forwarding the movement for outdoor recreation throughout the country.

Within the last few years there has been a widespread and spontaneous movement for outdoor recreation. Thousands who formerly spent their vacation days abroad or at some nearby resort are traveling long distances by rail or motor to visit the mountains, lakes, and forests of our own country.

In part this movement is explained by the betterment of roads, the wide ownership of automobiles, the diversion of travel from Europe by the circumstances of the war, the advertising of our recreation opportunities, and by the prevailing prosperity. A deeper cause is the existence of a new appreciation of outdoor recreation, a new impulse to seek the wholesome environment of the hills and forests and to refresh mind and body through the vigors of mountain and camp life.

This movement is of great importance to the public, both because of the benefits to the people that come from outdoor recreation and because there must be a large participation by the public itself to provide facilities that can be enjoyed by all. That the opportunity for relaxation, exercise, and play out of doors means a factor in public health and in meeting social problems is well recognized in our larger cities and industrial centers. Millions of dollars are being expended on municipal parks, interior squares and breathing spaces, out-of-door playgrounds, public golf links, tennis courts, ball fields, bathing beaches, and



MOUNT HOOD IN THE OREGON NATIONAL FOREST

This is one of the most beautiful of our western mountains. The Forest Service is building scenic roads and trails and improving camp grounds for visitors. Thousands of seekers of out-door recreation visit this wonderful region every year.

the like. The benefits from such facilities in increased health, in mental stimulus, and in contentment and happiness can not be measured. The problem is absolutely basic to the social well being of our nation.

The new recreation movement reaches beyond the immediate problem of the city parks and playgrounds. It seeks to draw people to the country, to the fields, the forests, the lakes, and the mountains. It aims to afford opportunities not only for the well-to-do who can afford a long trip by rail or motor to an attractive resort, but also and especially for those of less means to have the refreshment that comes from days spent in natural woodlands and the open country.

Recreation has an important place in the new movement to enlarge the system of federal and state forest reservations and parks and to acquire woodland parks for municipalities. While the occasion for such reservations is frequently the protection of watersheds, timber production, or other public benefits, all of the areas afford opportunities for outdoor recreation. Equally true it is that recreation has an important place in the demand for a large program of road improvement and extension.

The federal Government has an important part to play in the movement for outdoor recreation. This is in part because the Nation owns large areas of forest and mountain land; in part also because many other federal activities contribute directly or indirectly to recreation. The work of the Government naturally centers in the public properties, the National Parks, National Forests, National Monuments, and wild life reservations, which include the National Game Preserves and Bird Reservations. In addition, the work of the Biological Survey in wild life conservation and of the Bureau of Fisheries in maintaining the stock of our streams are powerful factors in drawing people to the forest and field. The great work of road building under the direction of the Bureau of Public Roads is opening recreation areas heretofore inaccessible, developing highways that in themselves are objectives of the traveler, and creating by example and education an appreciation of the beautification of highways by planting and of the preservation of scenic values on and near the roads. The educational work in forestry by the Forest Service, in park development by the Park Service, in improvements of public grounds and planting about the home by the Bureau of Plant Industry, all serve to stimulate an interest in the out-of-doors, and aid in forwarding the great purpose of public health, contentment, and national efficiency that are back of the outdoor recreation movement.

A broad federal policy of recreation should include all of the permanent reservations, each performing a definite function in a comprehensive program. It should include also the various other activities, for

each contributes in a large way to national recreation.

With the great public reservations used already by millions for recreation, with extensive field organizations each performing some function in recreation development, the federal Government should take the leadership in the movement, giving its moral support to the activities of other public and private agencies, and correlating their efforts where these touch those of the central Government.

For the most part the recreation work of individual federal bureaus in their respective fields is excellent, though the lack of a central policy guiding the efforts of all in conformity to a broad national program detracts from their affectiveness. There are, however, two basic problems that are causing grave difficulties. The Government's failure to meet these with a definite and firm policy is causing confusion, retarding progress, and actually jeopardizing public interests.

Both problems relate to the National Parks. One is the question of what areas should be included in National Parks, especially when this involves the transfer of lands from existing National Forests. The second problem is whether the economic resources within the Parks shall be used for industrial purposes. The two questions are very closely related. Their solution is of far-reaching consequence, for the policy adopted will largely determine the future success of the National Park undertaking and profoundly influence the Government's future work in recreation.

There are today eighteen National Parks located in fourteen States and Territories and comprising nearly eight million acres of land.

The one thought in the minds of the Nation in setting aside the National Parks has been to preserve the natural scenic and historic features of extraordinary interest and to make them available for all time for the enjoyment of the public. They are in a real sense reservations and should be withdrawn from industrial development. They are great public playgrounds and not places for timber operations, commercial grazing, or other industrial enterprises. It is only very recently that the question of commercializing the National Parks has been raised and there is a tendency in that direction which is very disturbing to every friend of the National Park system.

The National Forests comprise approximately 155 million acres located in 27 States and Territories. The National Forests have been set aside as permanent public reservations to safeguard and perpetuate the forests, to protect water resources, and for other general public benefits. Vast in extent, the forests contain important economic resources, such as timber, water, forage, and minerals. Situated in the mountain regions, they have scenic features of stupendous grandeur and exceptional beauty. Their forests are the home of large quantities



A CAMPING PARTY IN COLORADO

Snowmass Lake, in the Sopris National Forest affords excellent fishing, and each year is visited by campers who enjoy the high mountains. In the background is Snowmass Peak, which reaches an elevation of more than 13,000 feet. There are hundreds of superb points like this in the public forests of Colorado and elsewhere.

of game and wild life and their waters afford some of the best fishing in the country.

These various resources are protected from depredation and injury and are utilized under careful and scientific methods. The principal of coordinated use guides the handling of the different resources. Thus, in utilizing timber the sources of water are safeguarded, and the cuttings are so located that the features of scenic importance are carefully protected. Grazing is regulated in a way to prevent damage to the watersheds; and also it is correlated with the perpetuation and building up of wild life. The recreation opportunities and the wild life are regarded as important natural resources to be protected, used, and developed in correlation with the timber, grazing, waters, and minerals.



ALASKA TOTEM POLES

Nothing can be more impressive than the old villages and burying grounds of the Indians, tucked away in the primeval forests of the Alexander Archipelago, in Alaska. The day of stealing these splendid tokens of a past period has happily passed, for they are now carefully guarded by our National Government.

Thus there are two classes of permanent reservations side by side which are being used and developed for recreation. A considerable part of the general public today finds difficulty in distinguishing between parks and forests. This is because in many cases they are situated side by side in rugged mountainous regions, with very similar problems of administration and ests of the same types, and having similar prolbems of administration and development. In fact, travelers often find it impossible to determine the difference between a park and a forest on the ground except by boundary signs and survey lines. The most important National Parks of course have some feature of special interest, like a single high mountain peak, a great canyon, stupendous valley, or unique water fall. Surrounding these features there are usually areas which are very similar to extensive areas in the adjacent National Forests.



RICH INDIAN RELICS IN ALASKA

The totem poles and old Indian dwellings are being protected on the Federal reservations. Old Kassaan is of special interest, and it has been set aside as a National Monument to give double assurance of its preservation. It is located on Prince of Wales Island, in the Tongass National Forest in southeast Alaska.

In view of the fact that the physical difference between the parks and the forests is in many cases so slight, we must look to the main differences in the purposes and policies of administration. Previously there was a clear distinction between the two classes of reservation. It was generally accepted that a National Park should be devoted wholly to park and recreation purposes and that the development of economic resources should be excluded as inconsistent with these supreme purposes. Areas on which the resources should be used for the industries would be retained in the National Forests.

Recently, however, a new situation has been developing. The growth of the movement to visit our western mountains and the development work in the parks, accompanied by wide advertising of their attractions, have brought these areas into great prominence and popularity. This has stimulated the movement greatly to enlarge the National Park system, with many proposals to transfer large areas from the National Forests. At the same time the industrial development of the West has gone forward with increased intensity. Much of this development depends upon raw resources in the mountains, and within the last few years the demand for timber, forage, and water for power and irrigation on the properties owned by the Nation has increased with great rapidity. It is no longer possible to segregate great areas of mountain land without including natural resources that very soon will be needed by our industries. This industrial process has already reached a point of causing strong pressure for the use of economic resources existing within the boundaries of the present National Parks. This is expressing itself in measures in Congress for the opening of the National Parks for economic development, measures which are finding very considerable support.



FISHING IN SNOWMASS LAKE, COLORADO

In our federal forests and parks there are thousands of lakes and streams that are the objective of fishermen and campers. The stocking of these waters by the Bureau of Fisheries is a valuable service in encouraging out-door recreation. Snowmass Lake is in the Sopris National Forest.

In most cases the proposals for new parks involve areas within the present National Forests. Some of the proposals have been presented in the form of bills in Congress; in other cases they have been agitated by local organizations looking to later petitions to our National Legislature. Already proposals have been made for more than 30 new National Parks to be created from lands now within the National Forests, involving many millions of acres. Some persons have even gone so far as to advocate that practically the entire crest of the Sierra Nevada and of the Cascade Mountains and other extensive areas be incorporated in National Parks. The movement has already reached a point when the policy as advocated by many would, if carried out, result in the practical partition of the National Forests, the effect of which would be very serious from the standpoint of public interests.

The movement for a great expansion of the National Parks, to be carved out of the National Forests, immediately raises the question of industrial development within the parks. The withdrawal of large areas of land from industrial use results in a great deal of local opposition. Thus, when a new National Park is proposed there are usually two local factions developed: those urging the park, often with the idea that the name will advertise the country and with the mistaken belief that there will be a larger development of scenic highways than if retained in the National Forests; and on the other side those who oppose the park because they prefer to see the timber, forage, water, and other resources utilized under proper restrictions. Very commonly a compromise proposal is the result; namely, to create a park, but with provision for the utilization of the economic resources where this does not conspicuously deface the country or otherwise injure the value of the area for recreation purposes.

This sort of compromise is well illustrated in some of the bills now before Congress. Already several measures creating National Parks from National Forest areas would permit the use of the lands for the grazing of



A BAND OF MOUNTAIN SHEEP IN COLORADO

The protection and perpetuation of wild life is an important problem in our public forests and parks. Already in the Colorado National Forests the mountain sheep are increasing. A glimpse like that in the picture is worth many days of hard travel. The view was taken in the Cochetopa National Forest.

domestic stock, for developing water for power and irrigation, and even for *acquiring title to land under the mining laws applicable to the public domain.* I have even heard advocates of specific park proposals urge that there is no reason why the forests also should not be utilized if lumbering is confined to portions of the park not seen by tourists.

With this changing viewpoint that no longer regards a National Park as an area to be withdrawn and devoted solely to the preservation of the scenic and historic features and to recreation use, the inevitable is happening and there is increasing pressure to secure by Congressional and administrative action special authority to develop the waters for power and irrigation and to graze livestock in the existing National Parks. Timber cutting will be the next step. This pressure is illustrated by the bill, already passed by the Senate and now before the House, to build certain reservoirs in the Yellowstone Park for irrigation development. The policy of the Department of the Interior has encouraged this new viewpoint, for it has publicly endorsed the bill to promote the development of water within a portion of the Yellowstone Park.* It has further approved a provision in the Roosevelt Park Bill to permit the acquisition of private mining claims under the general mining laws, and has given assurance regarding grazing that has led people to believe that this would be allowed on a generous scale in various of the parks.



WHITE TAIL DEER IN MINNESOTA

Thousands of deer are to be found in our public forests. Every year sees better game protection. Let the public back up our laws and help those in charge of these properties to safeguard this splendid resource from depredations of game bags and pot-hunters. This photograph was taken in the Superior National Forest.



A GROUP OF ELK IN MONTANA

It has been an uphill fight to preserve our native elk herds. Fortunately, the struggle is succeeding. This view shows a part of the Sun River herd in the Lewis and Clark National Forest. Many campers go to this region to see and to photograph the elk, and in the season there are opportunities outside the game for seekers of legitimate hunting.

Thus it will be seen that the distinction between a National Park and a National Forest becomes increasing-

*The Department later reversed its first recommendation on this measure.

ly more difficult to draw. If the idea of utilizing the National Parks for the development of economic resources continues and new parks are created with this understanding, they will soon lose their distinction and the basic purpose of the Nation in their establishment will be defeated.

The consequences of this situation will be serious both to the parks and to the forests. In the first place it would be increasingly difficult to determine what areas should be included in parks. So long as it is the policy to create parks only where there are features so unique as to justify their complete withdrawal from economic use, a high standard may be maintained. Otherwise, pressure for specific parks, in many cases urged for local advertising purposes, will tend to lower the standard and ultimately to cheapen the whole system. Again, the precedent of permitting economic use in specific cases would bring such pressure upon the park administration that the dominance of recreation development would inevitably be constantly lessening as increased development of other resources takes place and would finally be lost except in name, with the result that the administration would become one of coordinate use of all resources just as in the National Forests.

The effect on the National Forests would be especially serious. These areas have now been under administration for over fifteen years. They are being handled under plans that look forward many years, based upon their yield capacity for timber and forage. Many industries are dependent on these resources and are built up with the knowledge that there will be a permanent supply of raw materials. A public policy that may at any time cut several hundred thousand acres from the heart of a National Forest makes planning impossible, either by the Forest Service or by the communities and industries that are being built up on the basis of their resources. In short, the fundamental feature of permanence is at once destroyed and supplanted by uncertainty. Plans for a sustained yield under long-term working plans, with all that this means in stable industries and community development, are upset at a single stroke. If the vast plan of partition of the National Forests as advocated by many were carried out, the whole system of national forestry would be placed in serious jeopardy.

The people of the West are now accustomed to the clearly defined policies of the National Forests. Segregation of large parts of them to be handled by another organization would lead to different policies. The



THE PEOPLES PLAYGROUND

The public should provide facilities for outdoor recreation to as many persons as possible. Many public forests are needed, federal, state and municipal, so that all may be able to enjoy their benefits. This picture shows what Los Angeles is doing for its citizens, by furnishing a municipal camp on the Angeles National Forest, which is within reach of all citizens, including those less well-to-do.

breach in the progressive system of road building inaugurated by the Forest Service and of systematic plans for the scientific use of all resources would be confusing to the general public. Two federal timber policies, two grazing policies, two water resource policies, side by side, handled by two sets of officials from different Federal Departments, would create an administration that would be inefficient and costly, and it would be a situation wholly intolerable to the public.

A natural query is why the various bureaus in charge of the Federal reservations do not agree upon a common policy regarding the points discussed in the foregoing pages. Whatever the reasons, the fact remains that there is not a common policy and that legislation is repeatedly recommended to Congress by one department that is inconsistent with that recommended by another department, with resulting confusion to Congress and the general public. This is due in part to faulty departmental organization. A deeper cause is that there has been too much attention given to forms of reservations, to names, and to procedure, and not enough thought to the large recreation problem which includes the activities of all units of organization that are directly or indirectly concerned.

There is needed first of all a broad policy that sets forth the large public objectives of national recreation, the opportunities and needs of development, the basic principles underlying the establishment and purposes of the federal reservation and the functions of each in working out the large national program.

All friends of outdoor recreation, and all representatives of the federal bureaus have a single large objective. They ought to have no difficulty in agreeing upon the basis of a national policy. With the larger objectives and principles in mind comprehending the whole field of Government responsibilities taken together, the methods of working out a program become questions of lesser consequence, and would no longer tend to obscure the main public issues.

I have no doubt that if the President should request the formulation of such a policy by the departments concerned, it would be quickly worked out, with an agreement as to organization, methods, and procedure. With a basic policy which would become the policy of the whole Administration to be followed by all constituent members of the executive branch of the Government, order could be brought out of chaos.



A MUNICIPAL CAMP IN THE ANGELES NATIONAL FOREST IN CALIFORNIA

The city of Los Angeles has developed two public camp grounds in the nearby National Forest. Here, for a very small cost, people can bring their families for a two week's vacation, to secure the refreshment of the high mountains and pine forests. It means health, contentment and increased efficiency to the citizens of that city.

Outline of a Recreation Policy.

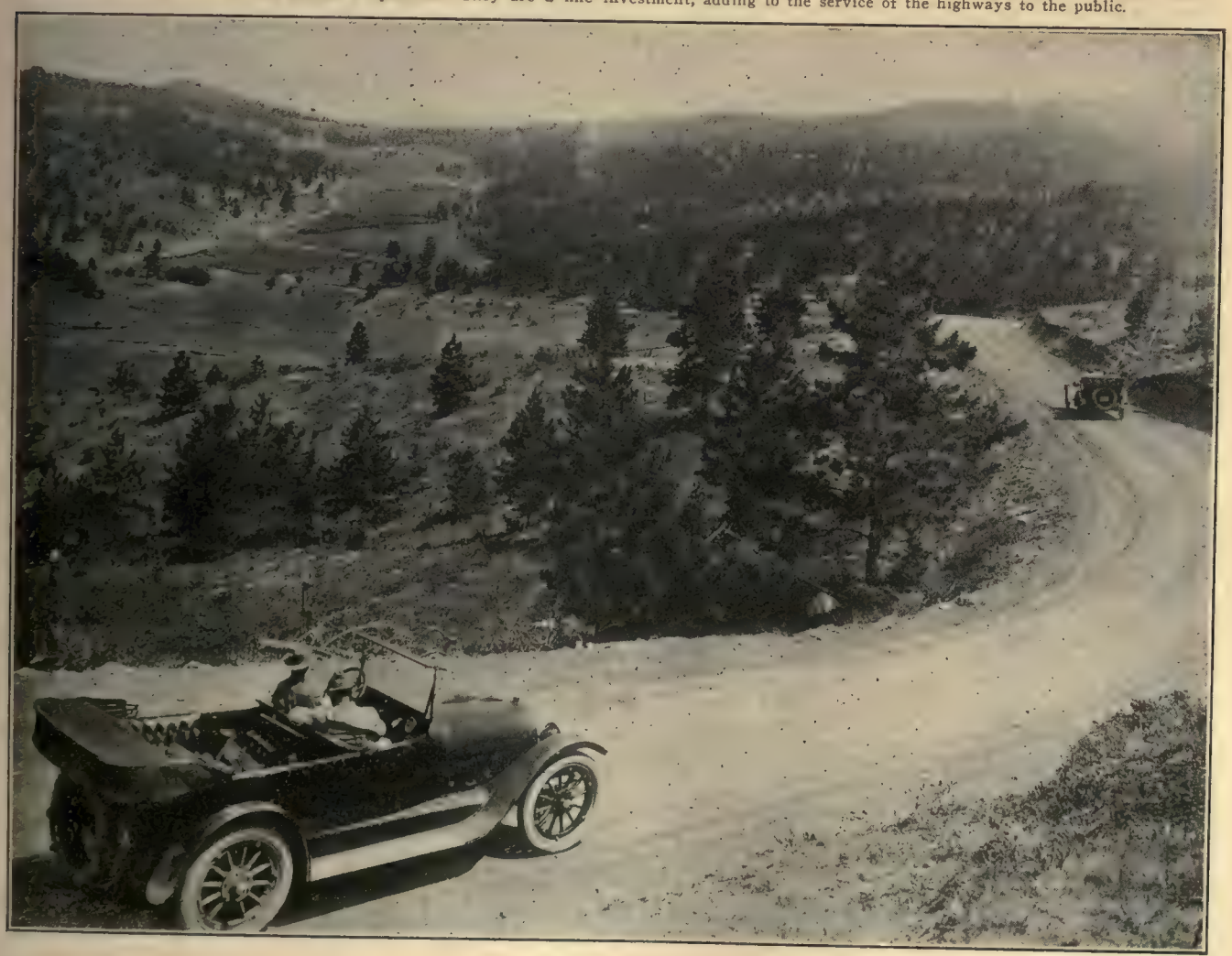
More specifically and in summary a national recreation policy should comprise the following points:

1. The formulation of a comprehensive base plan for all the Federal reservations, taken together, indicating:
 - (a) The recreation opportunities.
 - (b) The needs for the development of these opportunities.
 - (c) The relation of the recreation objectives in the various reservations to each other, regardless of the class of reservation, and the relation to similar points in State, municipal, and private areas outside.
 - (d) The relation of these to the plans for road and trail building within and outside the public properties.
 - (e) The function of each class of reservation and federal organization in carrying out a progressive plan of recreation development, with all working toward a common objective and each supporting the other.
2. On public properties not closed to industrial use, the correlation of the recreation development with the



SAFEGUARD THE BEAUTY OF OUR FOREST HIGHWAYS

The preservation of the beauty of the forests along our highways is important in the public reservations; it is equally important outside. Some states are already purchasing strips of timber on private lands to prevent injury to the scenic values along the public roads. Where no forests exist, roadside trees should be planted. They are a fine investment, adding to the service of the highways to the public.



A NATIONAL FOREST ROAD

Roadbuilding is an important feature of the development of our public forests and parks for recreation. Not only do they make accessible the recreation areas, but the highways themselves are objectives for visitors. It is all-important to preserve the forests along these scenic roads. This picture shows a road in the Pike National Forest in Colorado.

use of other natural resources, such as timber, forage, minerals, water for power and irrigation and domestic supply, and with wild life conservation.

3. A clear-cut policy regarding transfers of lands within National Forests to National Parks based on the principle that this will be done only in the case of areas of a character so unique as to justify their withdrawal from all economic and industrial development, and where they are large enough to necessitate a separate administration that can not be given under the present jurisdiction of the Forest Service.

4. A policy of administration of the National Parks that excludes economic development of natural resources like timber, grazing, etc.

5. As a corollary of the foregoing, not to include in new National Parks areas of merchantable timber and other resources which by their nature and location will inevitably be needed for industrial use.

6. Joining hands of the different federal agencies in promoting recreation development outside of the public properties. The activities would include encouragement of the establishment by States, municipalities, and quasi-public organizations, of reservations suitable for recreation use, the correlation of these with the federal properties where practicable, the encouragement by demonstration and education of preserving scenic values along highways and of roadside planting, and the stimulation of activities by States and other agencies in wild life conservation. Through joint planning by the different federal agencies in this co-operative work, the part to be played by each of the bureaus would be clearly defined so that each would have its particular field of enterprise and there would be mutual support by all in the public leadership of each.

7. Encouragement of the organization outside of the federal service of a recreation council, representing the great associations of the country interested in outdoor recreation. Such a council would be able to render a public service through the education of its constituent members regarding the problems throughout the country, in bringing about harmonious and unified action in all recreation matters, by promoting sound principles of recreation development through federal, State, and municipal activities, and by its counsel to the public agencies as a spokesman of thousands of persons throughout the Nation interested in outdoor recreation.

8. The transfer of the National Park Service to the Department of Agriculture in order that its work may be more closely correlated with that of the Forest Service, the Biological Survey, the Bureau of Public Roads, and the Bureau of Plant Industry, which are the chief organizations, outside the Park Service, carrying on activities related to recreation. No single step of organization would be as effective as to bring under one departmental head all the main work of recreation. As a separate bureau the individuality of the work of the Park Service would be preserved. Under a single Cabinet officer, all bureaus could more readily unite in joint enterprises.

Aside from a better correlation of all recreation activities, the proposed action would enable the National Park Service to have the immediate services of the Bureau of Public Roads in its highway construction, and to coordinate more effectively than at present its forest fire protection with that of adjacent National Forests.



A HIGH MOUNTAIN MEADOW IN GLACIER NATIONAL PARK

The National Parks are treasures of the nation, yielding rich returns in health and inspiration to the thousands of visitors. Let our Government contribute liberally to their support and development, and see that they are preserved as a precious heritage for all time.

PLANT MEMORIAL TREES FOR OUR HERO DEAD

INDUSTRIAL RESEARCH IN FOREST PRODUCTS

PRELIMINARY arrangements are well under way for a big get-together at Madison, Wisconsin, during the latter part of June to celebrate the tenth anniversary of the opening of the Forest Products Laboratory. It is expected that a large gathering of representatives from the various industries interested in the laboratory's work will be present, and opportunity will be afforded for recreation, as well as for becoming more familiar with the extent and significance of the laboratory's activities. The laboratory is a branch of the United States Forest Service, established in 1910, in co-operation with the University of Wisconsin, and is a consolidation of a number of testing laboratories and other units of the Forest Service, which had been located at various points throughout the United States. It is engaged principally in industrial research on problems connected with the manufacture and use of forest products, including besides lumber, posts, poles, ties and similar products, pulp and paper, naval stores, hardwood and softwood distillation products, and other chemicals and pharmaceuticals. At the present time, the laboratory employs about 200 people, and occupies five buildings in whole or in part.



MAIN BUILDING OF THE FOREST PRODUCTS LABORATORY

The laboratory occupies, in addition to this building which is the property of the University of Wisconsin, one other building smaller than this one, and parts of two other University buildings. It occupies also several other buildings of more or less temporary construction, such as the pulp digester house, the box laboratory, the sawmill, and the various storage sheds.

An excellent presentation of the work done at the laboratory was made recently by Hon. A. P. Nelson, of Wisconsin, in an address in Congress in support of the appropriation desired for the laboratory. He said:

"I happen to be quite familiar with the work of the Forest Products Laboratory located at Madison, Wisconsin, having been 13 years a member of the board of regents of the University of Wisconsin, and a member of the board when this laboratory was located at Madison in 1910. I can, therefore, speak with some degree of authority and with information gathered from observations of the work of the laboratory on the ground of operations. So strongly do I feel that this laboratory should be encouraged in its splendid work under the excellent supervision of its director, Mr. C. P. Winslow, ably supported by the assistant director, Mr. O. M. Butler, and the efficient members of the staff—who are men of high caliber and large scientific attainments—that were it not for the very strained condition of our National Treasury and the general slogan for retrenchment of expenditures I would, at the proper time, move an amendment to double the appropriation called for in the bill. Indeed, I sincerely hope that we shall agree that it will be a matter of economy and conservation of our commercial, financial, and economical resources as a Nation to increase this appropriation in next year's budget to at least $500,000, so as to give adequate support to one of the most important scientific bureaus of investigations and tests carried on by our Government in the conservation of our natural resources.

"The present lumber and wood prices are the highest that have ever been known in the United States, and are still rising. In spite of rapidly increasing prices, which are partly due to the growing shortage of materials, there is an appalling waste and loss of efficiency in handling, through practically every phase of wood manufacture and utilization, from the logging operations in the woods to the completion, shipment, and even in the use of the final product. Losses in the seasoning of wood in the United States at the present time are conservatively estimated to reach nearly $50,000,000 annually. Every dollar of this loss is an added cost in the production of lumber and every board foot wasted

an additional drain on our rapidly diminishing forest resources. Several billion feet, worth in the neighborhood of $75,000,000, could be saved annually if full use were made of preservative processes for treating ties, poles, posts, piling, mine timbers, shingles, lumber, and other wood which is exposed to the weather and thereby subject to decay. A large percentage of the annual loss from fire in the United States of about $200,000,000 is in wooden structures, and this could be materially reduced through the development of fire-retarding paints and compounds and fire-resisting construction. A casual survey shows that the losses from faulty mill and shop practices in a wide range of industries amount to millions of dollars annually. Unnecessary losses through packing and shipment in poorly designed and constructed containers are variously estimated at from $40,000,000 to $100,000,000 annually for domestic shipments alone, and the packing methods used by American concerns in export shipments are reported by the Consular Service to be notoriously bad.

"Practically every city in the United States has its own building code, and for wood as a material there is the greatest confusion and practically unlimited range in requirements. Reasonable uniformity would be of obvious advantage to both manufacturer and consumer. In structural timbers, strength is ordinarily a prime requisite, yet for only two groups of timbers in the United States has a system of grading rules been developed which selects the wood on a basis of its strength. For lumber, practically every species has at least one distinct set of grading rules and several species have more than one set, and this from the standpoint of the consumer results in a confusion which places the average consumer at a great disadvantage in his lumber purchases.

"Of the material in the woods, only approximately 30 per cent appears in the form of seasoned rough lumber, and in the manufacture of the rough lumber there is a further waste which in some important wood-consuming industries reaches from 10 to 25 per cent, and in special cases even higher. In the bending of high-grade stock in vehicle making, for example, losses frequently reach 50 per cent. We are clearly falling far short of taking advantage of our opportunities for saving and utilizing this enormous waste.

"Many of the industries which manufacture and utilize wood are among the oldest industries, and as such have been very slow on their own initiative to improve their processes and cut down waste. The public is concerned as much as the industries, because inefficient methods and waste are exhausting our remaining timber resources and are increasing prices of all wood products to the consumer. The only effective solution of this situation lies in forest products research, provided for in the Forest Products Laboratory.

"It was for this purpose of promoting economy and efficiency in the utilization of wood and in the processes by which forest materials are converted into commercial



THE LOG YARD OF THE FOREST PRODUCTS LABORATORY

Practically all of the wood received at the laboratory for experimental purposes arrives in log form. The logs are stored in the yard until needed, and are then cut up in a special electrically-driven sawmill into the proper sizes for testing. This log yard has probably had stored in it from time to time more species of wood than any other log yard in the world.



MANUFACTURE OF AIRCRAFT PROPELLERS

The experimental manufacture of aircraft propellers at the Forest Products Laboratory, Madison, Wisconsin, and subsequent storage under controlled humidity and temperature conditions, gives an excellent opportunity for a study of stresses of laminated construction as influenced by manufacturing methods and climate.

products that the Forest Products Laboratory was established in 1910 by the United States Forest Service at Madison, Wisconsin, in co-operation with the University of Wisconsin. This laboratory is an institution of practical research and, with the exception of a similar, though much smaller organization in Canada, is the only institution of its kind in the world. Its organization of trained specialists conducts investigations into the mechanical, physical, and chemical properties of various woods and wood wastes and of processes and methods of manufacture and handling to secure greater efficiency and economy. When it is considered that the value of the products of the primary and secondary wood-using industries of the country aggregates over $10,000,000,000 annually, the importance of such an institution is apparent. Indeed, the hearings state that the lumber industry is the second or third largest industry of our country.

"In the early years of its operation, the laboratory's small organization of eighty-odd people devoted its attention primarily to the development of fundamental and correlated information of the properties of the varied available species of timber and to improvements in the more well-known and standard processes and methods in its utilization.

"At the outbreak of the World War, the importance of forest products to a successful national defense program—from the airplane propeller to the charcoal in the gas mask, and from the wood alcohol in the high explosives to the wooden container for the shipment of the shell—made necessary not only the use and application of the knowledge already gained, but a vast amount of further information which necessitated increasing the prewar organization. Since the close of hostilities, it has been found that the results of this work during the emergency are practically all applicable to industrial needs, and while lack of funds has made it necessary to reduce the organization over 50 per cent, the industrial requests for the wider effective dissemination and demonstration of the results already secured and also for further studies and investigations are sufficient to justify an organization far greater than is at present possible. These requests and opportunities are becoming increasingly broad and numerous, and failure to meet them is causing incalculable losses annually to the country. For example, one of the conspicuous lines of work which should be greatly expanded is the investigations to develop the general laws for box and container construction, the relationship between the size and contents of the box, the kind and thickness of material to be used, methods of nailing, strapping, and so forth, and further, special tests to check the application of general laws to special classes of containers. Tests of this character with proper co-operation with producers and shippers will rapidly reduce unnecessary losses, now amounting to millions of dollars annually. As one example of the value of forests products investigations, work of this character is known to have saved to the United States

several times more than the total sum spent to date in all forest products investigations.

"A system of grading for structural timber which permits its selection on the basis of strength, the prime requisite, has been developed and commercially adopted only for the southern pines and the Douglas fir of the West. Similar rules should be developed for hemlock and for other woods used for purposes where strength is a controlling factor. The growing scarcity of timber and the difficulty of securing high-grade materials in large sizes will result in the use of built-up timbers. Two years of war alone brought pronounced changes in this direction. If built-up timbers are to be used safely and economically, an extensive series of tests to develop the best designs and the most effective fastenings and joints is necessary.

"In addition to structural timbers, there are great possibilities in the use of laminated and built-up construction for many other purposes, such as wagon parts and smaller articles, like shoe lasts, and so forth. Any such development inceases utilization, reduces the cost of material, and the losses and time in drying. Fundamental strength tests should be completed for all American species, since only from these tests can be decided the comparative merits of various timbers, which are becoming scarce or high priced, and the possibility of using substitute timbers.

"Plywood is a comparatively new wood product, and compared to other materials of construction, little is known of its strength, of the comparative values of different species, the best methods of manufacture, the best glues and methods of gluing and of its merits as compared with solid wood. Its use is increasing, and information along the lines indicated is greatly needed. The development of glues is necessary from the standpoint of plywood and also from the standpoint of many classes

My dear Mr. Nelson:

Your speech in the House of Representatives on February 10, regarding the work of the Forest Products Laboratory of the Forest Service, at Madison, Wisconsin, has just come to my attention and I have noted it with a great deal of interest. May I not express my appreciation of the way in which you handled the matter. Your remarks will do much to make known the character and importance of the investigations conducted by the Laboratory and to bring about a wider recognition of their value.

Sincerely yours,

E. T. MEREDITH,

Secretary.



LOWER HALF OF LARGE BOX TESTING DRUM

This drum, at the Forest Products Laboratory, Madison, Wisconsin, which is so large that it occupies two full stories in height, is mounted on trunnions and is motor-driven. The boxes are placed inside of the drum and fall from one face to another, as the drum rotates. By means of suitable obstructions and guides, the boxes are made to fall in different ways, thus producing the shocks similar to those they might be expected to receive in service.

of laminated construction, and for those which are exposed to the weather and to moisture, water-resistant glues are necessary. Before the war there were no recognized standard specifications for glue. An excellent beginning was made in investigations of glues and their proper manipulation during the war, and the results of the work with waterproof glues and plywood at the Forest Products Laboratory saved the country over $5,000,000 in the procurement of this material during the emergency; but the bulk of the field still remains to be covered.

"For many purposes, such as furniture, vehicles, cooperage, and airplane manufacture, it is necessary to bend wood. Practically nothing is known as yet of the conditions under which this can be done most effectively and without the excessive losses at present common in commercial plants which waste high-grade, expensive materials.

"On problems connected with the drying of wood, much progress has been made in the development of general laws and in their application to a few of our more common woods and a few additional woods which can not be seasoned easily. The work done has made it possible, for example, to kiln-dry wood with safety for airplane construction during the war. Much remains to be done in the determination of general laws and in the application of results to the remainder of American species in commercial use, especially to such important species as Douglas fir, western hemlock, and some of the more refractory hardwoods. While the more important field is in methods of artificial drying, there is room also for a great improvement in methods used in the natural seasoning of wood.

"The life of the four to six billion feet of timber which decays in service each year could be lengthened from two to four times by preservative treatment. The work already begun to determine the efficiency of various preservatives under various conditions of exposure and when used with different species should therefore be hastened and completed.

"Preservatives not only prolong the life of treated woods, but make it possible to utilize the less durable species in the place of the more durable ones. Untreated piling of the best species when placed in exposed conditions is sometimes wholly destroyed in a few months. Work so far done indicates for this specific use the possibility of increasing the life to several years. Far too little has been done in the development of fire-retarding compounds for the impregnation of wood, and the possibilities are practically unlimited. Enough has been done in the study of methods of construction to show great possibilities in the reduction of fire risks by the develop-



A GLUE SPREADER

This machine is used at the Forest Products Laboratory in connection with investigations into glues, plywood and laminated construction. The illustration shows a veneer core being coated in both sides with water-resistant casein glue. Several glues of this type have been developed at the Laboratory.

ment of slow-burning construction and of fire stops. During the war, a cheap and practical wood coating was developed for airplane propellers which practically prevents the absorption of moisture and thus eliminates the shrinking, expansion, and warping which make airplane propellers useless. Investigations of this character should be extended to wood finishes and protective coatings in general, with the practical certainty of great benefits in durability and resistance to the absorption of moisture. There is a very general and urgent demand for the development of satisfactory coatings and finishes.

"Intensive technical studies of the operations of mill and shop practices of lumber, pulp and paper, and the secondary wood-using industries such as veneer and cooperage plants, furniture factories, sash and door mills, vehicle and implement factories, and various kinds of specialty shops by highly-trained technical men able to review the processes and problems of these industries in an entirely new light, can unquestionably bring about savings and increase efficiency amounting to many millions of dollars annually.

"The greatest possibility for utilizing the two-thirds or more of the material in the woods which is now wasted before the final product appears is through the chemical industries. Of these, the pulp and paper industry is the most important. Tests already begun to determine the feasibility of using other American species for pulp should be completed for all promising species. Further studies are needed to improve the efficiency of paper-making processes. The demand for specialty products made of pulp is rapidly increasing, and much work should be done on such products as fiber silk, twines, rugs, fabrics, and so forth. Losses through the decay of wood pulp in storage now amount to several millions of dollars annually, and the development of methods to eliminate this will benefit the supply, quality, and cost of print paper. Methods employed for the distillation of both hardwoods and softwoods are still primitive.

"Comparatively few species are used, whereas there is a possibility of using many, and the use of waste material can be greatly increased. Much should also be done regarding the possibilities of utilizing the products of wood distillation.

"Wood pulp made from spruce is now practically the basis for most of our news-print paper, and while the demand for news-print paper is increasing at an enormous rate the supply of spruce logs is decreasing at an alarming rate. Already the shortage is acute, and we are facing a paper shortage that threatens the suspension of many of our newspapers of the country. In the hearings on this bill we are told that 2,000 to 3,000 small newspapers face extinction unless the news-print supply is increased. No doubt, other woods can supply the



TESTING MECHANICAL PROPERTIES OF LARGE BEAMS

The specimen undergoing test is a laminated floor beam. While the use of laminated construction for members of this character is not new, it has recently received a decided impetus and experiments are under way to determine the exact value of the present types of laminated construction and to develop improved types. In testing these beams the load is applied through the two pads resting on top of the beam, each pad being one-third of the distance from the center of the beam to the outer supports. Pressure is applied to the pads by means of the metal beam, resting on them, and the two vertical screws opposite its center. The actual load is measured by the weighing beam shown in the right foreground.

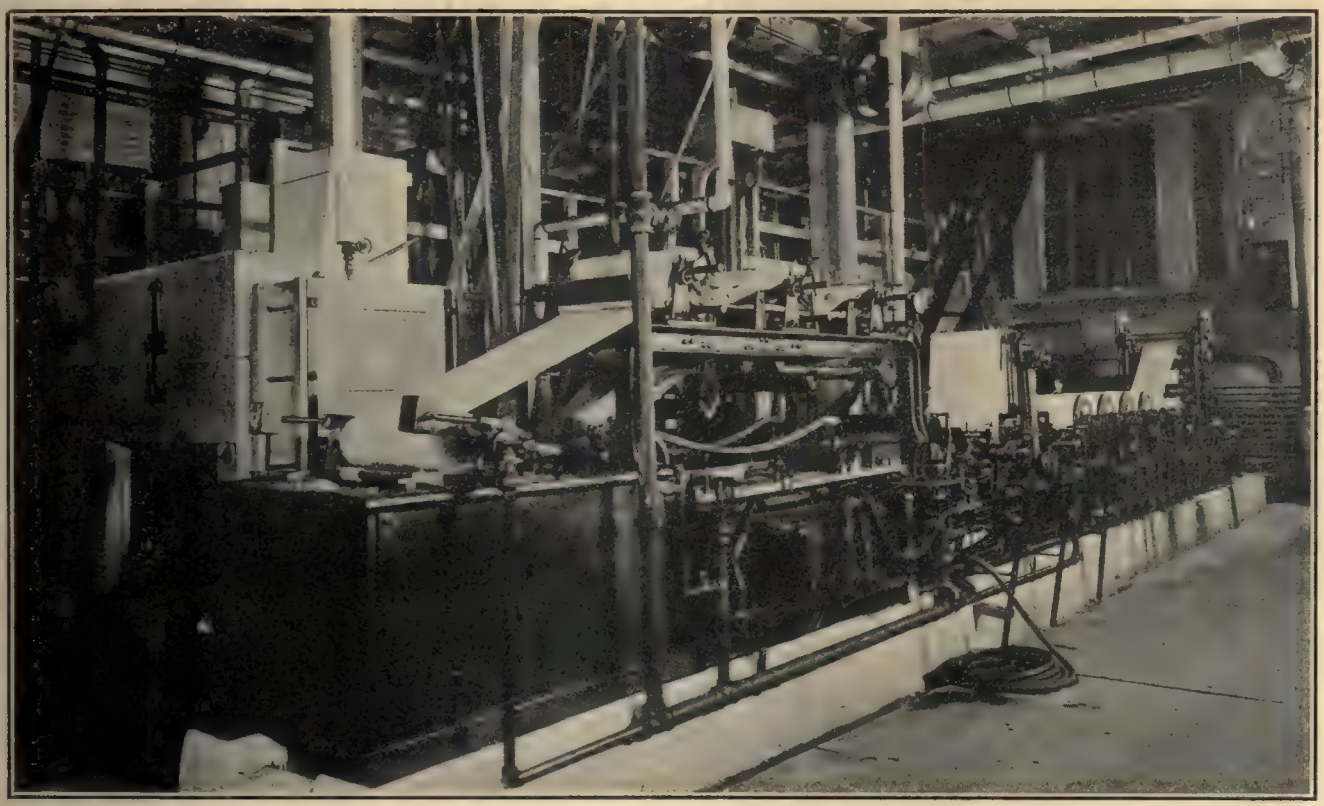
need. We should find by tests what they are. The Forest Products Laboratory, provided with adequate funds to carry on tests and experiments, would, undoubtedly, find some relief for the acute situation which now exists. Indeed, could Congress be made to realize and understand the importance of the pulp and paper division of the Madison Laboratory alone, it would gladly and promptly provide an adequate appropriation for its support.

"An important phase of forest-products research is co-operation with industries and the public, to assist as fully as possible in putting promising laboratory results into practice, and this phase of the work should be developed in proportion to the investigations. It is as important to see that the results of the work are effectively utilized as it is to conduct the research; this can only be accomplished by the development of a group of specialists able to lend assistance of a practical nature at the plant or place of operation of the manufacturer engaged in the use of wood or its by-products.

"In general, the Forest Products Laboratory is practically the only institution of appreciable size in existence which is devoting its attention solely to wood and its by-products. Its work bears directly on the problems of industries manufacturing annually products valued at over $10,000,000,000. The application of the results of the laboratory's investigations have already resulted in direct savings to this country amounting to many times more than the total cost of maintaining the institution during the past 10 years.

"There is an ever increasing demand upon the laboratory organization for further work, and this has never been more acute and important than now, when the constantly rising cost of lumber and other wooden products is making economy in the utilization of forest products of increasing importance not only to the industries concerned, but to the public as a whole. It would seem, therefore, a short-sighted policy to restrict the activities of this institution, and that in any sound policy of economy adequate provision for the continuation and expansion of the work of this institution should be made.

"Economy and efficiency in handling forest products, and a comprehensive plan for reforestation of our denuded wasteland areas, is a national necessity. One of the greatest and most important national problems today is the proper conservation and utilization of the products of our rapidly depleting forests. A national forest policy is one of the pressing needs in our reconstruction program."



PAPER MAKING MACHINE

This machine is used for determining the paper making qualities of native woods. Such information is urgently needed at present, on account of the rapidly diminishing supply of the woods commonly used for the manufacture of paper pulp.

STATE FOREST FIRE PROTECTION

BY E. C. HIRST, STATE FORESTER OF NEW HAMPSHIRE

THE growing interest in forestry has, during the past decade, found its greatest expression in the establishment of forestry departments by the States. There are now in thirty-two states organized departments carrying on forestry work. A few of these have only made a beginning by establishing an office in charge of one man, but at least twenty may be said to have well developed departments with highly specialized branches. In general, the work carried on by State forestry organizations provides for forest fire protection; reforestation of waste and cut-over land; acquisition and management of State forests, and for educational work among woodland owners.

The work of fire protection is, and will be for many years, the most important duty of State forestry departments. While a very few states have considerable areas of State forest land to protect, the largest work is the protection of privately owned forests. In this respect the work of the States must differ in methods and policy from the protection work of the Forest Service on the National Forests.

Since 1911, the fire protective feature of the Weeks Act has been a great spur to the States in the development of fire organizations, and in securing the legal and financial backing therefor. The present typical State forest fire organization comprises a commission or board, either named or appointed, acting in an advisory capacity in shaping the general policy; a State Forester, or Forest Commissioner, appointed by the above board and having direct administrative authority; a State forest fire warden appointed by the State Forester and having special charge of the fire organization; district chiefs having charge of all fire wardens, lookout watchmen, patrolmen, and of the enforcement of the fire laws in their respective districts, and the fire force composed of local wardens and deputies, lookout watchmen, patrolmen, employees of railroads and other co-operating companies and State departments.

A forest fire organization substantially as outlined is now an accomplished fact in about twenty states, and the nucleus of such an organization has already been started in twelve other states. With the encouragement offered to the states by the fire co-operative features of the Weeks Act, it seems safe to predict that within the next decade, practically all of the important timber states will be thus equipped.

The question then that should interest foresters and woodland owners is this: granting that all the states, or any group of states embracing one forest region, are equipped with an effective forest fire organization, can we look forward to a time when forest fires will be one of the minor considerations in our work and when more of our efforts can be given to silviculture and forest management?

For an answer we must go back to the fundamental question of the causes of forest fires and the possibility of the removal of these causes. Broadly speaking, there are two classes of direct causes and one contributing cause. The direct causes of forest fires are: first, mechanical or preventable causes; second, human or reducible causes. The mechanical causes are railroad locomotives, portable steam mills, and other mechanical equipment operated in forest regions. The human causes are due mainly to carelessness, and in a few instances to maliciousness. Most of the fires due to carelessness are started by smokers throwing down lighted matches, cigars, or cigarettes; by burning brush in dry windy weather and without sufficient help; and by hunters, fishermen and campers. The only direct cause falling outside of these two classes is lightning. Besides the direct causes there is the great contributing cause of inflammable slash and debris left after lumbering operations. For a satisfactory answer to our question, we must find a practical way to remove or reduce all these causes.

The greatest mechanical cause of forest fires is the operation of railroad locomotives through woodland regions. Fires caused by portable steam mills and other engines are negligible as compared to the total.

The best results have been obtained where the enforcement of railroad fire laws is vested in the State Forestry Departments. In 1915, a monograph prepared by Mr. Philip T. Coolidge covered very thoroughly the uniformity of forest fire legislation affecting railroads in the eastern and northern states. In the typical effective state law, the railroads are held liable for fire damage and the cost of extinguishing fires which they originate. They are required to use spark arresters and ash pans, subject to the approval of a Public Service Commission or similar State board, and are required to instruct their employees in the notification and fighting of fires. In the more advanced states, the railroads are given the right to clear inflammable material on woodland adjacent to the right of way at their own expense. One of the first steps to be taken in the further reduction of railroad fire damage should be to iron out the irregularities in the requirements of different states as to railroad fire protection. To do this, forest and railroad officials in each forest region should collaborate, probably through some central medium, and this seems to me best furnished by the Forest Service officials in charge of the administration of the Weeks Act. Through such collaboration; through the improvement of railroad fire fighting, and through prevention by patrols, fire lines, improved spark arresters, and the extension of all these precautions to all forest regions, railroad fire damage may be reduced to such a minimum that locomotives may be justifiably classed as a preventable cause.

The human causes of forest fires are carelessness and maliciousness or incendiarism. The latter cause is much

less frequent, but both are discouraging to combat, because in only a few instances can the real cause of a careless or malicious fire be definitely proved, and in probably half the cases, it is only suspected and not actually known. It is on account of the human factor that these fires are not and will never be absolutely preventable. They will be, however, reducible to a considerable extent, and the two means to such an end are education and the enforcement of law. In many of our states the enforcement of the fire laws is probably the weakest branch of the Forestry Department's activities. A few of the more advanced states are making remarkable progress in this matter. Education in fire protection has been conducted with various degrees of success in different states and forest regions by Forestry Departments and timberland associations. In the northwest, the publicity work of fire protection has been developed to a high degree of efficiency. There is still considerable work to be done in the studying of the different classes of offenders and the preparation of special educational work for each class. As educational work progresses, public sentiment will make it easier to enforce the law. It is in the matter of specialized education and publicity work on forest fires, adapted to each region, that the Forest Service, through the Weeks Act can render highly valuable service to the states.

There still remains the great contributing cause; namely, inflammable slash left after lumbering operations. So long as there is any considerable fire danger from mechanical and human causes, lumbering slash will constitute a menace to growing timber in its immediate environs; and conversely, if the slash problem is solved, the danger involved in the direct causes of fires will be greatly reduced. Certain it is that real forestry cannot be generally practiced in any forest region where coniferous stands prevail until provision is made for slash disposal. This is a problem which we cannot avoid. It is the next great step in the development of fire protection and the foresters must face it and solve it. It is quite impractical to recommend to any owner the expenditure of money in planting, thinning, or improvement cuttings when there is immediately adjacent to his holdings a dry slashing ready for the match, or even if there is likely to be.

The question of general slash disposal is a regional question and should be studied as such. Where enacted such laws constitute the farthest step in police powers that forest officials have yet been trusted with, and such legislation should be passed only after careful judgment and the consideration of eventualities. Such a law, if enacted, without careful study of economic conditions, and if enforced inadvisably might easily prove the pry for overturning a whole State Forestry Department.

The question should also be studied carefully for each region in order to determine the silviculture and fire protection necessities of the different forest types within the region, the methods of disposal that will contribute best to these ends, and the legal requirements for putting these into effect. It is easily conceivable that in one state the lumbering operations in two or more timber regions may require slash disposal by entirely different methods. Thus, in the operation of certain northern hardwood types, it may be found sufficient and altogether desirable to simply lop the large limbs and allow the remaining material to decay on the ground; with the white pine, it may be found better to pile and burn all brush during the lumbering operations; in the spruce region, it may be more advisable to lop the limbs from the tops and scatter them flat on the ground, and all of these conditions may prevail in one state.

We have seen by the foregoing that a number of states are now equipped with efficient forest fire organizations and ready to assume more authority and take on more activities in this field than they are now doing; and that such organizations are being started in other timber states. We have observed the great direct causes of forest fires to be railroads, and carelessness and maliciousness of individuals; that railroad fires promise to be preventable or reducible to a low minimum; that fires caused by carelessness and maliciousness are possible of considerable reduction, but that they will always constitute a serious menace; and that lumbering slash will always constitute a contributing fire danger.

It would appear that our best efforts should be directed toward the perfection of railroad fire prevention, the enforcement of law, and the systematic education of the public on fire protection, and that we should devote special attention within the near future to the matter of general slash disposal. The means to this end lie with the American Forestry Association, in its ability to study and present to the public the methods and costs of slash disposal in each timber region, and thereby to prepare the public mind for legislative enactments; and with the Forest Service through the officials in charge of the Weeks Act by collaboration with the forest officials of the several states.

THE ARECA PALM

LINNAEUS has called the palm family the princes of the Vegetable Kingdom, and the Areca Palm (*Areca Catechu*), because of its straight, tall and graceful beauty, as well as for its economic importance should not fail of mention. Owing to its slendor straightness, with a feathery tuft of fronds at its summit, it has been likened to "an arrow from heaven" by the Hindu poets. and one never sees a crooked growth in the membership of the Areca family. Its chief use is in its fruit, a small nut, not unlike a nut-meg, which has an annual export from Ceylon alone of 8,000 tons. The use of these nuts is in a combination with the leaf of a vine called Betel, and a pinch of lime. This is chewed as Europeans are accustomed to chew tobacco. The quid is made up of a thin slice of the nut and a bit of lime in the form of soft paste, rolled up in a betel leaf. It is called a masticatory; the expectoration from this quid or masticatory has the redness of blood; its use is universal in the east. When Bayard Taylor first entered India he was shocked by the impression that the entire population had hemorrhage; herein, then, is the commercial demand, chiefly from India, for 8,000 tons of the fruit of the Areca-nut palm. The users of this masticatory claim that it possesses sustaining qualities, that it reduces both thirst and hunger. Whether that be true or imaginery, it is surely, like tobacco-chewing, a filthy habit and one which we will certainly not charge against the beautiful Areca Palm.

THE VALUE OF THE IBIS

BY W. H. D. LESOEUF,

DIRECTOR, MELBOURNE ZOOLOGICAL GARDENS

IT is interesting to know that the ibis are found over the world and there are no more valuable birds than they. This was fully recognized by the ancient Egyptians, and there they looked upon them as sacred and mummified their bodies three thousand years ago and over. A closely allied bird is found in Australia, in conjunction with another variety, the straw-necked ibis, as well as a few of the glossy ibis. The two former birds exist in great numbers over the island continent and their value to agriculturists cannot well be overestimated.



STRAW-NECKED IBIS NESTING. THEY CONGREGATE IN IMMENSE ROOKERIES IN SWAMP-LAND TO LAST OUT THE NESTING SEASON

They congregate in immense rookeries in suitable localities during the nesting season, when the wet season has been good and the swamps have sufficient water to last out the nesting period, as many of them dry up by the end of the summer. Not long ago the birds misjudged the amount of water and the swamp dried up before the nesting was completed. The adult birds then left in a body and the crows and similar birds had a high time living on the deserted ibis eggs, but such a catastrophe does not often happen.

Not long ago, I visited Riverina, in New South Wales, with Major-General Sir Charles S. Ryan. We found the ibis nesting in a swamp of about 500 acres and covered with lignum bushes, the water was about three feet deep. We considered that there were about 200,000 ibis nesting there. In the centre of the swamp young birds were nearly able to fly, and fresh eggs were found on the outskirts, the whole host of birds was made up of varying sized companies, say from twenty pairs to one pair, and they arrived at different times. We shot a few of the birds and counted and weighed the contents of their stomachs. Their food consisted largely of young grasshoppers, with a few grubs, centipedes and fresh-water snails which latter are the host of liver fluke. We reckoned that the whole company of birds took every day the large total of about 482 millions of grasshoppers, as well as various other insects, and also that the total weight of the contents of their crops came to 25 tons. These figures are difficult to realize and therefore we can easily guess why the Egyptians valued these birds so highly. It is quite possible that the grasshoppers were more abundant than usual at the time of our visit, but that would not alter the fact as to the value of the ibis. The locust plague in Egypt is far more severe than we have in Australia.

The Egyptians also made their hawks, especially the Kestrel, sacred and mummified them as well, and we



NESTS OF STRAW-NECKED IBIS AT "WIDGIEWA," RIVERNIA, NEW SOUTH WALES

know that the Kestrel especially and also many other of the slower flying hawks feed largely on insect life. The grasshoppers have other enemies in Australia, fortunately, as when they lay their elongated eggs in the ground in small bunches, cockatoos often find them out, and digging up the ground with their strong beaks, devour many thousands of them, yet, I am afraid these birds often do not get the credit they deserve.

THE BATTLE AGAINST FOREST INSECTS

IMPORTANT results have been obtained in investigations of insects affecting forest resources, according to the recent annual report of the chief of the Bureau of Entomology, U. S. Department of Agriculture. An extract from the report follows:

"An especial investigation of the insect damage to crude spruce products for airplane stock in the States of Washington and Oregon showed that the greater part if not all of the damage could be prevented by proper methods of logging and production with little or no additional cost.

"Exhaustive studies of insect investigation and control were continued in the Sequoia and Yosemite National Parks. Much new information has been gained, and the methods of gathering and compiling field data have been standardized.

"A special study was completed on the interrelation of forest fires and insects on an area of about 8,000 acres in southern Oregon. This area had been under observation since 1914, and the fire had burned over about 800 acres in 1918. The records show that previous to the fire the insects had killed 485,000 board feet of timber. The fire killed 170,000 feet, and subsequently the slightly fire-injured as well as the uninjured trees in the burned area were killed by beetles, which were attracted from the surrounding areas. It was noticed that the infestation in the burned area increased more than 1,000 per cent, but it was found that the infestation in the surrounding areas decreased. It was also found that the broods of the beetles in the fire-scorched trees failed to develop to much beyond the original number that attacked the trees. So the fire did not contribute to an increase of the beetles in the general area or to the starting or extension of an epidemic of beetles. This result is of extreme interest and hardly to be expected.

"The most careful study ever made of the history of an epidemic infestation by tree-killing beetles was completed and a report submitted during the year. In the Rogue River area in about 48,000 acres, near Ashland, Oregon, the western pine beetle in 1914 caused the death of 346,000 board feet of pine timber. In 1915, 1,615,000 board feet were killed; 1,383,000 feet in 1916, and 608,000 in 1917. A count of the young and matured stages of the beetles that developed in an average foot of bark, and also of the number of exit holes through which the beetles emerged to attack other trees, showed that there was a notable decrease in numbers during the development of the broods each year in the infested trees on account of the increase of natural enemies and other disturbing factors. This helps explain why these beetle epidemics rise and fall within a limited period of years, and it explains how the western forests of yellow pine are naturally protected from total destruction. These facts are especially significant in connection with the application of the percentage principle of control, as by aiding the natural forces which work against the abnormal increase and spread of the beetles complete control may be gained. The history of this epidemic shows the importance of prompt recognition and prompt treatment of a threatened outbreak in order to prevent the great loss of timber which would occur before natural control became operative.

"Another special study was made of the number of all stages of the western pine beetle in 330 square feet of infested bark selected from 67 trees, which represented an average infestation within an area of approximately 36 square miles. It was shown that there is a large percentage of mortality between the young and matured stages in the developing broods, but that normally an average of about 150 beetles to the square foot of bark developed to that adult, or reproductive, stage; which would be 50,000 beetles to the average infested tree, or, say 39,000 beetles to 1,000 board feet of timber. Since it requires an average of about 10 beetles to the square foot to attack and kill a vigorous, healthy tree, it will be seen that all the pine timber of the western forests would soon be destroyed were it not for natural and artificial control.

"Experiments to determine the time of year to cut and the methods of handling mesquite for fuel, posts, etc., to avoid destruction by wood-boring insects, have been nearly completed, and the results show that serious loss in the Southwest can be prevented by cutting the trees in the late fall and early winter and piling the wood in loose piles until it is thoroughly dry. Damage to posts can be prevented by cutting them at any time and laying them on the ground where they will receive the full force of the sun, turning them occasionally so that the young stages of the borers will be killed by the heat.

"Studies of damage to lead telephone cables in California by a wood-boring beetle have been continued, and the results so far show that the beetle is able to penetrate alloyed substances that are considerably harder than lead. The problem is still unsolved, and it will be difficult to find a practical means of controlling this pest, which is able to put hundreds of telephones out of commission by boring holes in the cables, through which the water enters, rendering the wire connections useless until the place is found and repaired.

"Continued experiments with chemical substances applied to finished and crude forest products show that very few of the many substances that have been tried are effective, and, with crude products, none of them is so economical as simple and inexpensive management in logging and manufacture which will render the conditions of the bark and the wood unfavorable to attack.

"HALL OF FAME" FOR TREES



THE DESOTO OAK

The DeSoto Oak in the Tampa Bay Hotel Grounds, nominated for a place in the Hall of Fame by J. E. Worthington, managing editor of the Tampa "Times," has much upon which to base its claims for recognition. During the War with Spain General Nelson A. Miles made his headquarters for a time under this tree, but the history of the tree goes back much farther than that, according to Mr. Worthington. Here is what he says:

In the Tampa Bay Park is a large spreading oak tree which, so legend says, was the resting place of DeSoto on his first trip to Florida.

The tree is situated about 100 feet from the main entrance and has a spread of 120 feet with a height of approximately 80 feet. It is one of the handsomest and best proportioned trees in the city.

In the old Indian legends of the landing of the Spaniard reference is made to meeting places under the great trees and it may well be that this tree was one of them. At least legend makes the claim for the old tree and has for many years.

In 1526, an associate of Cortez, at that time ruler of Mexico, Pamphilo DeNarvaez, was made governor of Florida. This daring fortune hunter, in company with 200 followers, sailed from Cuba and finally landed in Tampa Bay. The expedition proved disastrous as the hostile Indians set upon them and soon they were nearly annihilated.

In 1539 Ferdinand DeSoto was appointed governor of the provinces of Florida and Cuba, and with about 1,000 of Spain's most wealthy and adventurous young men set out for the conquest of the New World.

DeSoto, who just prior to his appointment, had returned from a successful expedition to Peru was filled with ardor and desires for new fields of adventure. He landed on shores of Espiritu Santo (Holy Springs) Bay.

There are said to have been conferences with the Indians under this tree before they and the cavaliers fell out and DeSoto began that march which, after three years' time, landed him on the banks of the Mississippi, in whose waters he was finally laid to rest.

Soldiers of five wars have been drilled beneath this tree, nominated for a place in the Hall of Fame by Mrs. H. F. Lewis, secretary of Virginia for the Daughters of the American Revolution. It is known as the John Pemberton Oak. Under this tree Colonel John Pemberton mustered his troops for the Battle of King's Mountain in 1781. A marker has been placed on the tree by the Sycamore Shoals Chapter. The soldiers of the War of



THE JOHN PEMBERTON OAK

"HALL OF FAME" FOR TREES

1812 met here. Then came the Mexican War and the old tree saw men again leave their homes to fight. Next came the struggle between the States, and the oak witnessed the drilling of men to fight one another in their own country. Then came the World War and again the veteran oak saw our boys answer their united country's call.

The Lafayette Elm at Kennebunk, Maine, is widely known throughout New England. It was under this tree that General Lafayette lunched when he visited Kennebunk while touring the United States. The tree is nominated for a place in the Hall of Fame by Miss Ellen Darrach, of West Philadelphia.



THE LAFAYETTE ELM

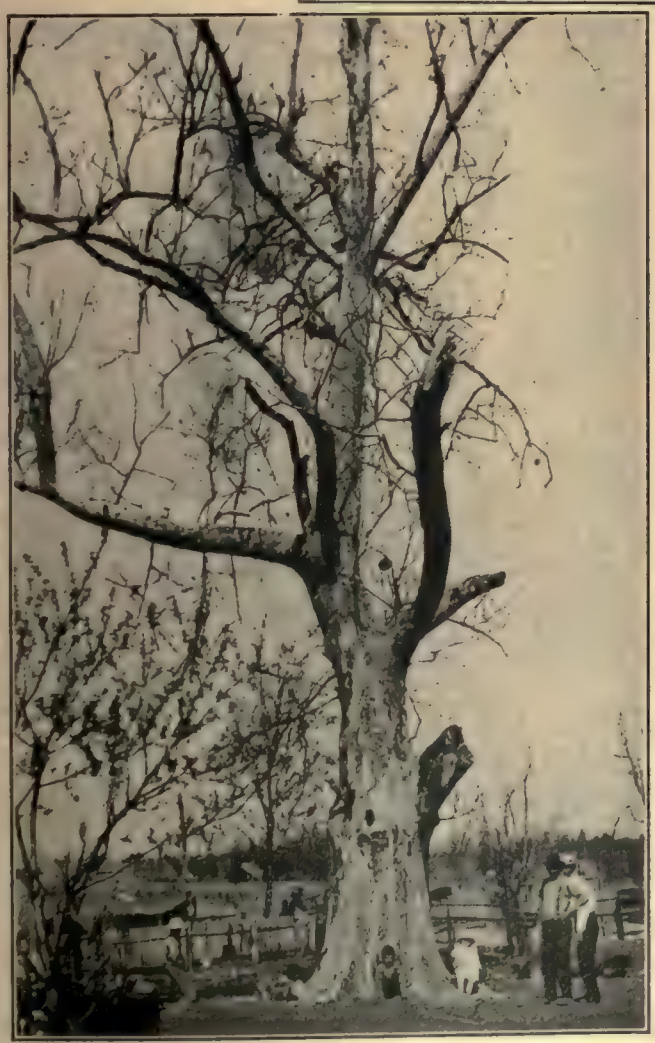
Here is a tree that literally jumps into the Hall of Fame for Trees, for according to J. J. Tisen, of Norris City, Illinois, who makes the nomination, that is just how this tree started. Mr. Tisen writes:

Hosea Pierce and a boy comrade returned from the War of 1812 to their homes, near Norris City, Illinois. It was in the spring of 1815, and on January 8 of that year they had helped General Jackson whip the British in the Battle of New Orleans.

These boys both attended a log rolling on the old Pierce farm that spring, and as they were returning to the house after their day's work, made a wager who could vault the farthest, using their cottonwood handspikes as vaulting poles. They both left their handspikes sticking in the soft earth where they had vaulted, and during the spring rains of 1815 they both took root and lived.

One of these trees died about ten years ago and herewith is a picture of the other which is still living and is now 105 years old. This tree has a peculiar base on account of the unusual manner of planting; is about 30 feet in circumference, 175 feet high with a very large hollow in the base of the tree which has been used as a housing for setting hens, a kennel for dogs and is always a fine playhouse for children.

The baby boy in white, Lowell Lee Fellinger, standing at the base of this remarkable tree is a distant relative of the fifth generation from this gallant patriot, Hosea Pierce, who helped the great General Jackson "lick" the British at New Orleans.



THE "VAULTING POLE" COTTONWOOD

"HALL OF FAME" FOR TREES

*Beneath
this tree, nomi-
nated for a place in the
Hall of Fame, the first white
woman who died in Colorado was buried.
Thirty-six people were massacred by the Indians
near this tree and fourteen men have been hung on it.
Theodore Anderson obtained this copy of the original picture for*

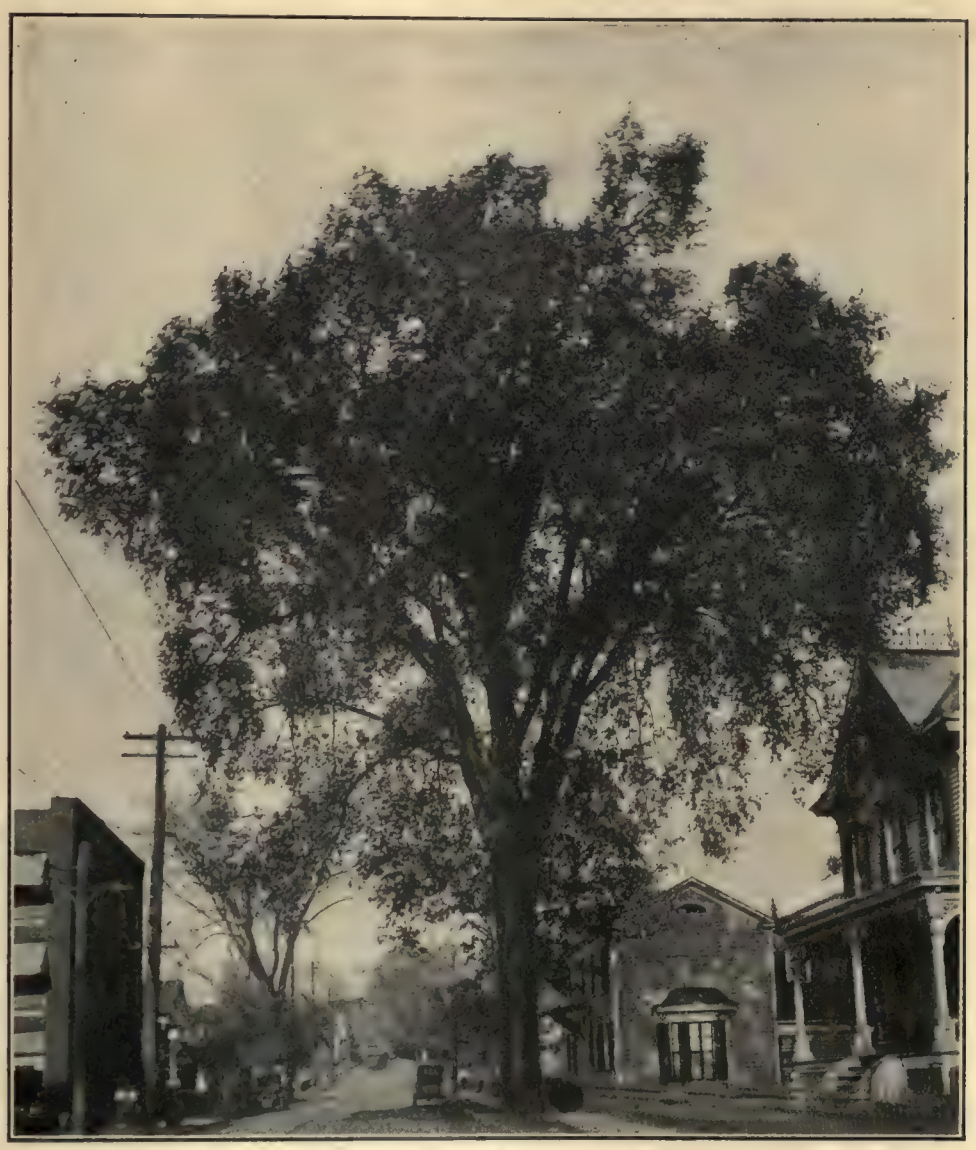


THE OLD MONARCH OF PUEBLO

*the American Forestry Association. The tree stood in the middle
of the street in Pueblo and was cut down June 25, 1883.
The age was estimated at 380 years. The cir-
cumference of this cottonwood was 28
feet. A cross piece of the tree is
on exhibition in the Min-
eral Palace at
Pueblo.*

"HALL OF FAME" FOR TREES

In the street at Carbondale,, Pennsylvania, standing in front of the property of W. W. Watt, is an elm that is considered one of the most perfectly proportioned trees in the United States. It has been nominated for the Hall of Fame for Trees, being compiled by the American Forestry



THE CARBONDALE ELM

Association at Washington, which is collecting data of all trees with a history in this country or any other. Is there a famous tree in your town? This tree has been nominated for the "Who's Who" by E. M. Peck, who measured the diameter at two feet eight inches and the height at seventy feet. The age of the tree is not known.

"HALL OF FAME" FOR TREES



(Courtesy, N. Y. City Dept. of Parks)

THE OAK FROM STRATFORD-ON-AVON

A little oak from faraway Stratford-on-the-Avon was planted in Central Park, New York, a few years ago, and it has been nominated for the Hall of Fame by Miss Viola Overman. The treeling was sent to Walter Hines Page, America's ambassador to the Court of St. James, by the mayor of historic Stratford, and the precious package was immediately shipped to the Shakespeare Garden Committee of Central Park. An appropriate program was arranged, and with much stately ceremony, the famous little stranger was planted in that corner of the Park known as "Garden of the Heart."

The "Corner Oaks" at the foot of Marlin's Mountain at Marlinton, West Virginia, are nominated for a place in the Hall of Fame of the American Forestry Association by Andrew Price. These oaks were marked "General Andrew Lewis, October 6, 1751." General Lewis was the hero of Point Pleasant and was the military trainer and patron of George Washington, who tried to get Lewis appointed commander-in-chief of the armies in the Revolutionary War, but afterward the appointment came to Washington himself. Marlinton is on a bottom known as the habitation of the first English settler west of the divide. Mr. Price says the oaks are the oldest marked corner trees in the Mississippi Valley.



"CORNER OAKS" AT MARLIN'S MOUNTAIN

"HALL OF FAME" FOR TREES

For the Old Mulberry Tree at St. Mary's, Maryland, the claim is made that it was the most famous tree in the colonies. The claim will be disputed by many, particularly by the friends of the Great Tree on Boston Common which saw so much history written. Both trees fell in 1876, one hundred years after the Declaration of Independence. All the history of Maryland is written around the Old Mulberry for it was there Lord Calvert landed and it was for years the site of the capital of Maryland. The Old Mulberry Tree is nominated for a place in the Hall of Fame by Mrs. Delia Harris Maddox, who has written a poem about the famous tree. To Mrs. James Berry, of Washington, we are indebted for a picture of the tree. The picture is made from a drawing penciled in 1852. Mrs. J. Thomas Brome, of St. Mary's, and Mrs. Maddox have obtained much interesting data in connection with the tree and J. W. Thomas in "Chronicles of Colonial Maryland." As far as known Mrs. Berry had the only piece of the tree in existence. Bits of this she presented to E. B. Calvert, of the U. S. Weather Bureau, and to Dr. George W. Smith, of Washington, but a larger piece, carved with an anchor, Mrs. Berry has presented to the American Forestry Association, and it is a real relic.



THE OLD MULBERRY TREE

MOTHS AND BUTTERFLIES

BY R. W. SHUFELDT, M. D.

(Photographs by the author)

SHOULD you happen to be passing through a piece of woods almost anywhere in the Atlantic States during the latter part of July, woods containing maples, oaks, poplars, and others, there would be noticed scattered here and there upon the ground under the oaks or maples, certain little black, barrel-shaped bodies, each about a quarter of an inch in length. If found, it would be well to bring the leaves of that tree under most searching observation. If you have good eyes, it will not be long before you will locate overhead a very large caterpillar, quietly munching a leaf. Should it prove to be the big, hairy specimen here shown in Figure 1, you will have discovered the larva of one of our most elegant and largest moths—the Imperial Moth or *Basilona imperialis* (Figs. 1 and 3). Your giant caterpillar may either be a bright green color or a dull brown—it is the same species, however. Such examples of different coloring of caterpillars are to be observed in the case of several other species; but when the moths emerge from the pupæ of either the green or the brown ones, all the characters are the same, quite irrespective of the color of the caterpillar.



A FULL-GROWN LARVA OF THE IMPERIAL MOTH, NATURAL SIZE, FROM LIFE

Figure 1. This big caterpillar (*Basilona imperialis* of Drury), is an omniverous feeder on the leaves of trees and shrubs; it may be of either a green or a brown color, a dichromatism that in no way effects the moth. Another peculiarity is their hairiness, here well shown.

To get the specimen home, the best way to do is to cut off the twig bearing the leaf upon which it is feeding—say a couple feet of it, including six or eight of its leaves. This will be the best kind of a perch for it in the event you desire to obtain a negative of the specimen. In the home workshop or study-room your *Basilona* caterpillar should be carefully placed in a cage, and regularly fed with fresh green leaves of the species of tree upon which you found it. In due time it will pupate—you will discover the pupa somewhere in the cage, the dark brown thing having much the same appearance as the pupa of the Regal Moth.

The pupa must now be left perfectly undisturbed in a warm room until the moth issues from it. Some morning, upon looking into the cage, this very thing has come to pass. Your specimen may be suspended like the Regal Moth here shown in Figure 4, either on one of the sides of the breeding-box, or from some dried leaf or twig within it. Often it is only holding on by its fore feet; is either perfectly quiet, or its wings may be trembling. In any event, it will not be spread out in any such fashion as are the two Imperial moths shown in Figures 2 and 3. These are cabinet specimens, and beautifully mounted ones at that.

The female moth is much larger than the male; and while the forms of the antennæ are different, the basic color of the wings is the same—a rich canary yellow both above and below. On the upper side of the inferior wings there is, in either sex, an oblique, narrow band of pinkish purple, with an isolated, small circle of the same color above the middle of it. In addition to this there is a thickish sprinkling of the same color, as fine dots, all over the wings, which, in the male, runs into solid areas at the bases of the wings, which area, on either side, is four times more extensive in the superior wings than in the inferior pair. In the female these solid areas of color are represented only by rather broadish zigzag lines. Again, in the male, there is a solid, elongate patch of the same tint occupying the outer part of either superior wing, coming clear to its edge for the entire length. There is also a zigzag, oblique bar here, running from the outer upper angle

of the wing to the lower margin at the junction of its middle and outer thirds. These bars are also seen in the female; and in either sex are seen two small, independent circlets, situated rather above the middle of either of the superior wings.

In these moths, the only markings repeated on the under sides of their wings are the oblique bars and the circlets, which latter are reduced to solid, big dots. Both sexes have their abdomens marked by bands of the same pinkish purple seen on the wings, there being one or two more bands in the male, in which the remainder of the body, apart from the head, presents areas of this color, it being nearly solid.

There is a pair of horns on each of the two leading segments of the body of the larva of this moth, and these are proportionately larger in the younger stages.

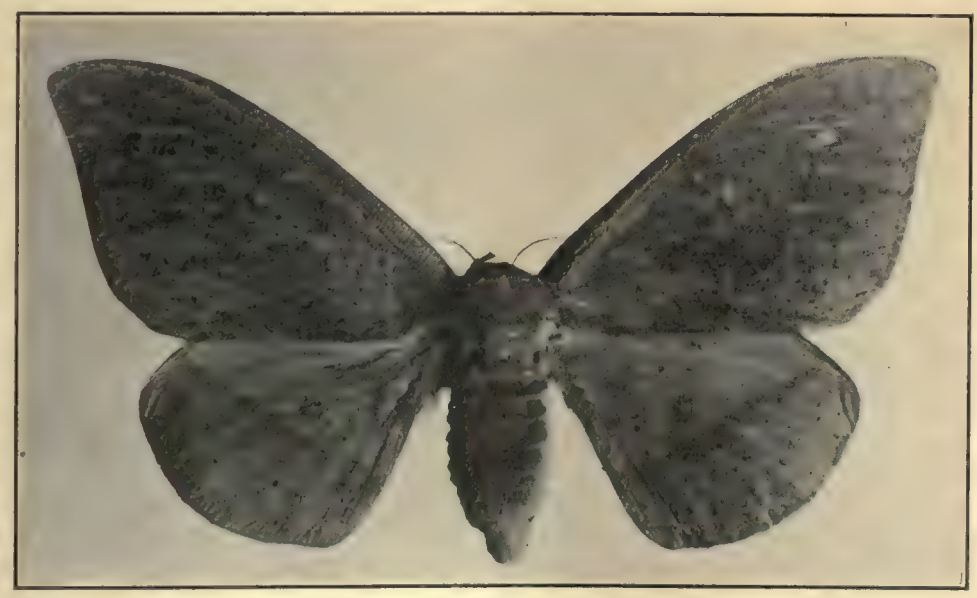


THE SUPERIOR VIEW OF A MALE OF THE IMPERIAL MOTH (UPPER CUT), WITH A SIMILAR VIEW OF A FEMALE OF THE PROMETHEA (*Callosamia promethea*).

Figure 2. Both of these moths belong in the collection of Mr. Wm. Schaus, of the United States National Museum. The male "Spicebush" is an entirely different looking insect from the female of the species.

Although the larva of this Imperial moth is an omnivorous feeder in the plant world, it can do no material harm, in so far as the writer's observations go, to the trees of the forest, or to those planted for shade in towns and cities. They do not build a web; only a few specimens ever occur on the same tree, and unless one knows how to search for them, they are but rarely observed. This is true of all the larvæ of our big moths, and of not a few of the smaller varieties. On the other hand, there is not a single moth in our fauna that is not worthy of our highest admiration, in so far as its form and coloration go. The markings and tints in some species are simply gorgeous; and yet they pale in the presence of some of the moths of tropical countries.

One of the most remarkable experiences in capturing moths is given by Wallace in his book "The Malay Archipelago." Wallace was at Sarawak, Borneo, early in December, 1885, and occupied a cottage in the hills. "On one side of the cottage there was a veranda, looking down the whole side of the mountain and to its summit on the right, all densely clothed with forest. The boarded sides of the cottage were whitewashed, and the roof of the veranda was low, and also boarded and whitewashed. As soon as it got dark I placed my lamp on a table against the wall, and with pins, insect-forceps, net, and collecting-boxes by my side, sat down with a book. Sometimes during the whole evening only one solitary moth would visit me, while on other nights they would pour in in a continual stream, keeping me hard at work catching and pinning till past midnight. They came literally by thousands. These good nights were very few. During the four weeks that I spent altogether on the hill I only had four really good nights, and these were al-



UPPER VIEW OF A FEMALE SPECIMEN OF THE IMPERIAL MOTH

Figure 3. This fine example was collected by Mr. G. Beyer, and is now in the United States National Museum. It is a pale yellow, with markings of purplish bands and with speckles and other spottings.

ways rainy, and the best of them soaking wet. But wet nights were not always good, for a rainy moonlight night produced next to nothing. All the chief tribes of moths were represented, and the beauty and variety of the species was very great. On good nights I was able to capture from a hundred to two hundred and fifty moths, and these comprised on each occasion from half to two-thirds that number of distinct species. Some of them would settle on the wall, some on the table, while many would fly to the roof and give me a chase all over the veranda before I could secure them. In order to show the curious connection between the state of the weather and the degree in which moths were attracted to light, I made a list of my captures each night of my stay on the hill. On twenty-six nights I collected 1,386 moths, more than 800 of them were collected on four very wet and dark nights. My success here led me to hope that, by similar arrangements, I might in every island be able to obtain abundance of these insects; but, strange to say, during the six succeeding years I was never once able to make any collections at all approaching those at Sarawak." Doctor Wallace then gives some of the reasons for this lack of success, as dryness of the season; residence in a town or village not close to a virgin forest; other houses in the neighborhood, and the interference of their lights with those in the house occupied by him, and so on.



MALE REGAL MOTH SEEN UPON UPPER VIEW

Figure 4. Other figures of this species (the *Citheronia regalis* of Fabricius), are to be seen in the July, 1919, AMERICAN FORESTRY; it is here shown as it appears in nature, with drooping wings and clinging to a twig among the blossoms of a laurel bush. This specimen was reared by Mrs. Bert Elliott, of Washington, and is now in the collection of the writer.

In the United States there is another beautiful moth in *Callosamia promethea*, a species wherein the sexes are so different that the ordinary observer may well be pardoned for mistaking them for two very distinct species. Lutz, in his "Field Book of Insects," says: "I am sorry that such an authority as Holland should have called this species the Spice-bush Silk-moth, when 'Promethea' was already in common usage; furthermore, he says, truly, that the 'insects subsist in the larval stage upon a great variety of deciduous shrubs and trees, showing a special predilection for * * * spice-bush and sassafras, wild cherry, tulip and sweet gum trees.'"

Nearly every one in the Atlantic States, who pays any attention whatever to such things in nature, is familiar with the small, swinging, bag-like cocoons of the *Promethea* larva. Usually they are seen during the spring and winter months, suspended from the twigs of the sassafras and spice-bush, and from some other shrubs and trees. Promethea's caterpillar is a handsome one, being of a bluish-green color, spotted, and ornamented with coral red tubercles on the second and third body segments, with another on the middle of the next to the last segment behind, and smaller ones on the intervening segments. Several authors have figured this larva, one of the best cuts being that of Riley's, used by Doctor Holland, who says: "Whether the silk produced by this common and easily reared species could be utilized in such a way as to make its production commercially profitable, is a problem to be solved in the future. No one up to the present time has succeeded either in reeling or carding the silk of the cocoons."

Years ago, Packard, Dimmock, Minot, Edwards, Morris, Brodie, Saunders, Lintner, Harris, and other entomologists, contributed to the life-history of this beautiful insect; but none of them seems to have very much to say about its being a dangerous tree-pest; and as a matter of fact, the harm it does in such directions barely amounts to anything worthy of notice. Promethea, however, is a beautiful creature in nature, and should be studied for its own sake, to the enlightenment of all who treasure knowledge as such, quite irrespective of the fact of there being any commercialism as its ultimate goal.

We have in our insect fauna two other species, namely the Tulip-tree Silk-moth and the White-banded Silk-moth (*Callosamia calleta*)—at least the present writer gives the latter insect that vernacular name because it may be distinguished from the other two species by the single white band on the collar and by another at the base of the thorax.

The common Promethea ranges over nearly all the eastern part of the United States, from southern Canada to Florida, westward to the eastern boundary of the Great Plains.

In the case of the Tulip-tree Silk-moth, it does not attach its cocoon to the twigs of the tree upon which it is made, but it winds leaves about it. So, when the latter falls to the ground in the autumn, the pupæ go down with them. Up to date this moth has been found only along the Atlantic coasts, where it is by no means abundant.

Perhaps the most remarkable fact to be noticed in regard to these Promethea moths is the truly extraordi-

nary difference to be observed in both form and coloration in the males and females. (Fig. 2, lower one, and Fig. 7). On their upper surfaces, the wings of the male are a deep snuff brown—that is for their inner moieties. These areas are limited externally by an irregular, zigzag line of a much paler shade, which runs, on either side, about parallel to the body. Proceeding towards the margins of the four wings, this zigzag line is followed by a broad band of a paler shade of brown than the snuff color of the body and mesial areas of the wings described above. These wings are broadly emarginated with pale ash, broader in the anterior wings than in the inferior or posterior ones. There is a beautiful, round black spot in the middle of the superior outer angle of either anterior wing, bordered internally by a very fine blue line. Above



THREE BEAUTIFUL AND WELL-KNOWN BUTTERFLIES

Figure 5. In the center of this cut is an elegant specimen of the common Tiger Swallowtail butterfly (*Papilio turnus*), seen on upper view. The small butterfly in the lower left hand corner is a Buckeye, the *Junonia coenia* of Hubner, while the one in the opposite corner is the silver-spotted skipper (*Epargyreus tityrus* of Fabricius). These are all abundant forms of United States butterflies of the Middle States, especially the big black and yellow one, which is widely-known to both city and country people.

this the wing is purplish, and exhibits fine, hair-like markings, wihch are carried down in a series of double loopings through the outer, ashy margin of either wing. This margin, in an inferior wing, has a subterminal, fine, wavy line all the way around, and within this again a row of dark spots, usually about 13 in number. The outer margin of the brown band that follows is serrated (Fig. 7).

Seen on upper view, the female is much paler in color, and the pattern and markings are far more complicated than in her consort. As to the pattern, it is well shown in the lower cut of Figure 2, while the emarginations are pale ash, spots of the lower wings pompeian red, the dark areas being of various shades of brown, purplish, black, and white zigzag lines, and the rest. On their under sides, the wings of these moths are much lighter in coloration, which is often the case in these insects as well as in many butterflies.

Speaking of butterflies, one of the handsomest species we have in our United States fauna is the widely known Tiger Swallowtail (*Papilio turnus*). Every intelligent and observing schoolboy knows this big black and yellow insect by sight, though doubtless not one lad in fifty is familiar with even so much as its common name, to say nothing of its scientific name. The writer has met with a few boys—a *very* few boys—of from twelve to fifteen years, who could, off-hand, give both scientific and common names of this butterfly—one of our most conspicuous ones. In connection with this be it said, however, that the fact generally came to light that the fathers or mothers of those boys were either professional entomologists, or possessing intellectual qualities above the usual run of the average man and woman.

Our Tiger Swallowtail is a very abundant species in some sections, and more or less in others. Fifty years or more ago, it was a rare thing to see one of these butterflies in southern Connecticut, while they were frequently seen all along the Gulf States, and especially over the country about the city of New Orleans. In the latter locality the elegant green lizard, known as the American Chameleon (*Anolis*) appeared to be especially fond of them, being particularly expert in capturing specimens that happened to alight in a place where the reptile could stalk them. At the height of the season it is not an unusual sight, in a locality favored with respect to quiet and the flowers they love, to see twenty or thirty of these insects hovering over the same field. Virginia is a great

State for them, and Holland remarks that at Berkeley Springs, in West Virginia, he counted, one summer day, forty specimens hovering over the weeds and flowers in a small, deserted field. That was surely a good day for Tiger Swallowtails! In regions where they are especially abundant, it is not an uncommon thing to see six or eight settling on some moist spot in an open place in the woods, or on the edges of a big puddle in the road, or on certain chosen sites on the banks of rivers and streams. There, too, we will see other species of butterflies associated with them, as the black papilios of the region, the buckeyes, and the silver-spotted skippers (Figure 6).

On the 14th of August, 1919, the writer was collecting butterflies at the upper end of Rock Creek Park, Washington, D. C. It had rained heavily a few days before and at one place, on a moist spot in the middle of the wood-road, there were gathered on about a square foot of ground no fewer than thirteen elegant specimens of these Tiger Swallowtails; while flying up and down the road, in the shade of the many birch trees growing there, were many others, associated with several other species. With considerable difficulty a big camera was gotten into position to get a negative of that remarkable assemblage of insects. Unfortunately the removing of the focusing cloth from the camera, though done with the greatest possible care, gave them alarm; they arose *en masse* to disperse, alighting in various other places.



SPICE-BUSH SWALLOWTAIL BUTTERFLY JUST ALIGHTING UPON A HEAD OF PURPLE PHLOX

Figure 6. Nearly every one is familiar with this large showy black butterfly of the Atlantic States. Some of our insect collectors devote themselves entirely to this gorgeous group of insects, and their cabinets contain only representatives of them to the exclusion of all other forms.

It is a strange thing that a creature as frail as the Tiger Swallowtail should be endowed with such wonderful powers of flight. With a body but of little more than an inch in length, and very slender, and with a wing extent rarely exceeding four and a half inches, this dauntless insect is as much at home in the air as any bird that ever lived. With strong and steady flaps of its wings—darting here, and hovering where fancy leads it—it soars, without apparent effort, to the tops of the tallest trees of the forest; sails in the bright sunlight through the open glades, soon to descend, in a zigzag course, to alight upon the royal purple head of an Ironweed. Upon meeting one of its own species, the two execute a kind of aerial waltz as they flit above, below, and around each other in their play on the wing. Coming out into the open fields, their giddy flight leads them here and there in varied course, as they visit the flower-tops of thistles, goldenrod, and other attractive plants. Growing thirsty, down they come to some low, flat bank of a sluggish stream, attracted by the presence of others of their kind, and sip away to their hearts' content, pausing only now and then for a brief frolic in the sunlight with some other big, black and yellow vagabond of their own sort with no more in its bit of a brain to worry it.

When we come to study the black forms of the United States swallowtails of the genus *Papilio,* we have an interesting group of species for consideration. Doctor Holland gives us colored figures of the majority of these, or of such of them as had been discovered and described up to the date of appearance of his "Butterfly Book;" and while his description and plates are extremely useful, there is much that is lacking in them. Only too often he omits any description whatever of these black swallowtails, and the reader must rest satisfied with the statement that "the figures in the plates obviate the necessity for describing this familiar but most beautiful insect, the glossy blue-green of which flashes all summer long in the sunlight."

Now the under sides of the wings in all of these Swallowtails of the genus *Papilio* present a very different color-pattern to that upon their corresponding upper surfaces; and yet, how few experts ever think of describing these. Recently, the writer has been paying considerable attention to this group, in the field and in collections; and forms of this black Swallowtail have been taken presenting color-patterns that are strikingly different from those found in any work on the subject illustrated by colored plates; later on some of these will be briefly described. While color-pattern is often of considerable value in the matter of determination of species, and to a lesser degree in classification, it is, as a

matter of fact, of very minor importance as a factor when compared with the structural character of these insects. This is to some extent paralleled by what we find in birds—that is to say, in the differentiation of species and subspecies, color of plumage and color-areas of plumage constitute the chief characters by means of which we draw such lines. Geographical distribution is also of great importance in such matters, and to a far lesser extent this latter aid may be considered in the case of moths and butterflies. When we come to decide to which group any particular bird belongs—its external characters being of a puzzling nature—we resort to a more or less thorough study of its structure or anatomy, or, as modern biologists have it, its morphology.



MALE OF THE PROMETHEA MOTH VIEWED FROM ABOVE

Figure 7. This figure, from the collection of Mr. Wm. Schaus, should be compared with Figure 2 of this article, when the striking difference in the males and females of this species will at once be appreciated.

So it is with puzzling discoveries in the moth and butterfly assemblages. With respect to the vast numbers of new forms of them being almost daily taken by entomologists in different parts of the world, correct diagnoses can often be made off-hand; while in other instances abundant material of a comparative sort must be at hand and employed, in that the exact position in the system of some of these forms may be determined. Specimens have already come into the possession of science wherein doubts were entertained for some little time as to whether the insect, in any particular case, was really a moth or a butterfly.



THE CATERPILLAR OF THE PROMETHEA MOTH

Figure 8. This larva, here seen upon left lateral view, is of a light green color and very brilliant. The four anterior tubercles are of a bright coral-red color; the two posterior ones are of a pale yellow.

This will account for the fact that both moths and butterflies have, in the case of many species, been anatomically studied with great minuteness. Such studies and investigations should interest every intelligent forester in this country; and should he be so placed that he cannot well enter such fields of research, he ought to do all in his power to encourage it in others and assist to the utmost whenever he can.

In passing through timbered areas, the forester will often note leaf destruction in the case of certain trees. Frequently it requires but a few moments' search to discover the cause of it; and should it prove to be due to the ravages of a band of caterpillars, examples of these should be at once collected and brought to the attention of some competent entomologist, who will make the proper use of such information when it comes into his possession. Damage and destruction has often been "nipped in the bud" in our forests through prompt action in such cases — that is, where a non-expert has made the initial report.



SAME LARVA IN THE FIRST STAGES OF MAKING ITS COCOON

Figure 9. For the above purpose, it rolled one of the leaves of the wild cherry, upon which it was feeding at the time of its capture.

Sometimes, when his time and surrounding admit of it, the forester or the cultivator of trees may do good work along the above indicated lines, which, if intelligently carried out, may lead to the securing of very valuable information. At times it may confirm the labors of others; then, again, should the investigator be more or less familiar with the literature on our moths and butterflies; should he possess the means to purchase the simple appliances for laboratory work, and have the

facilities and proper place to carry on his investigations, there is no reason why he should not be able to stamp his researches with the trade-mark of originality.

In the forest, nursery, orchard, or in the care of shade trees, he will soon become expert in the detection of the eggs of moths and butterflies where those insects deposit them in nature. Under the microscope these eggs are often very beautiful and vary greatly in form and color. They are usually deposited on the under side of leaves, and sometimes on their upper surfaces; in most instances on the leaves of the trees upon which the caterpillars feed when they hatch out. Such eggs are also laid upon twigs of trees and shrubbery. We have much to learn about the eggs of these two groups of insects, as for example the probable reason for the female's selecting the place where they are deposited; the number laid; their form and size; the fate of infertile eggs; whether the female lays one or two clutches,—that is, whether the species is single-brooded or otherwise; the time required for hatching, and numerous other points.

All these lines of inquiry and research are best pursued through the actual breeding of the specimens; and while this requires no end of work and patience, the information gained is, as a rule, of very distinct value and wide application. Regular breeding cages are made for this purpose; or the investigator may, if of a mechanical turn of mind, readily construct one for himself. Models will be found in any work treating of the subject; and if many are required for the breeding of different species, they may easily be made of proper-sized boxes with wire gauze tops. The writer has often constructed such cages or breeding-boxes, and successfully reared a variety of moths and butterflies. Usually this has been done by collecting the caterpillars, as they are far more easily discovered than eggs, and produce the imagoes much sooner. Both methods, however, should be followed. Very perfect specimens of many of our most beautiful moths and butterflies may thus be obtained for the collection and for study. Very recently, and in years gone by, the writer has thus secured cecropias, silk-worm moths, many lovely butterflies, io moths, *Philosamia cynthia, Hyphantria textor,* moths of the tent-caterpillar, and so on.

This is as far as this subject can be carried at present; at another time the question of collecting moths and butterflies in their haunts will be taken up, together with their subsequent preparation, preservation, and classification. One gains a very meagre idea of the extent and grandeur of the world's lepidoptera as a whole from seeing a complete collection of the moths and butterflies of the United States. We have very, very few large and showy butterflies; while in the case of the moths, were we to substract from them a couple of dozen of the largest species, the collection would at once appear to be quite mediocre. We have some eight species of big Hawk-moths; then we have three or four big ones, or fairly large ones, in the *Samia* group (*Saturnidæ*); the Regal, Luna, and Imperial moths; *Rothschildia orizaba* and *Callosamia,* which last is not very large (Fig. 2). The balance are practically all small species; and while some of them are rather showy, the vast majority are not over an inch across, of some uniform shade of brown or tan, with usually inconspicuous markings.

To gain some idea of the splendor of some of the world's moths and butterflies, one should glance over nearly complete collections of them from the tropics as they occur in South America, Asia, Africa, and the great Eastern and Western Archipelago, with certain parts of Australia. Such collections are to be found in the United States National Museum in the reserve and duplicate series. There is, for example, a superb species that comes from Africa, wherein the "tails" to the hinder pair of wings are over eight inches in length. Then we have the gorgeous Atlas moth of the East Indies that measures a foot across from tip to tip of its upper wings, while its markings are most conspicuous. So bizarre and intricate are some of the markings of these moths and butterflies that any species among them would require a printed octavo page to describe them. The rare African butterfly, *Papilio antimachus,* has very narrow fore wings that, when spread, measure ten inches across. Its coloration is striking, as its fore wings are of a dark brown shade, marked with curiously shaped spots of a tan yellow, the hind wings being of a bright tan yellow, spotted and deeply emarginated with glossy black. Drury figured this species first in 1782; but more than eighty years passed before a second specimen was brought to Europe. Many collections on the Continent now have a specimen or two in them.

The rare south Brazilian butterfly, *Dynastor napoleon,* measures fully seven inches across, and is of a brilliant black, with an oblique white band between the middle and outer thirds of either fore wing, and with a broad tan-colored edge to the hinder wings. However, it is quite useless to attempt to give any description in writing that will convey to the mind of the reader any idea whatever of the truly magnificent splendor of scores of these great insects. In the entire series, every color known to man is to be found; and some of the combinations are so bizarre as to defy description in words. Gold, silver, and coppery markings are not rare, and occasionally the markings on the wings are transparent, being bordered with black or some vivid color, frequently orange, red, or azure.

Nearly all of our United States moths and butterflies are easily captured, but not so with many of the tropical ones of the latter-named group. The South American species of *Morpho* are magnificent insects. The great long-winged orange species (*M. hecuba,* Linn., and *cisseis,* Feld) are fully nine inches in expanse, and have a lofty, sailing flight, while some of the species with broader and shorter wings, such as the black-bordered *M. menelaus,* have a lower, but very rapid flight through the forest, and settle occasionally. The high-flying species very rarely come within reach. Collector Bates says that although he often saw the beautiful *M. rhetenor,* Cram., one of the most richly blue Amazonian species, he was only able to obtain two specimens in eleven years. This, and several blue species, have an orange female.

while others have two forms of female, one orange and the other blue; and others again have females resembling the males.

The high-flying species of *Morpho* which inhabit the mountainous districts of Western America, are much easier captured than those which frequent the plains, though their capture is often attended with difficulty and danger. One naturalist in Bogota fell over a precipice and broke his arm, and then found that he had three days' journey to make on horseback before he could meet with a doctor to set it. Another naturalist, who was collecting in Bolivia, found that *Morpho godartii,* Guer., a beautiful species, of a rather light blue, which was previously almost unknown to entomologists, frequented an inaccessible ledge in the mountains; he was obliged to have himself lowered by ropes over the precipice before he could obtain it.

RAISE SALARIES OF FOREST SERVICE EMPLOYEES

IT has long been a matter of common knowledge that employment conditions in the Federal service are chaotic. This is not surprising in view of the fact that there has been no thoroughgoing reclassification of the service since 1853. The seriousness of the situation, however, has not been generally realized until within the last few years, when a growing discontent and an increasing flood of resignations has threatened the integrity of the entire service, including, of course, the Forest Service.

As a remedy for this condition the Joint Commission on Reclassification of Salaries has proposed the establishment of 1762 "classes" of positions, the positions within each class involving substantially the same duties and qualifications and receiving the same range of salaries.

Seven of these classes have to do with men engaged in forestry, which was classed by the Commission in the e engineering group of services. Two of these classes (Junior Forest Aid and Senior Forest Aid) are subprofessional in character, and five (Junior Forester, Assistant Forester, Associate Forester, and Senior Forester) are professional and include only men having the equivalent of a degree from an institution of recognized standing with major work in the biological or engineering sciences. Aside from the degree of responsibility involved and the length of experience required, the definitions of duties and qualifications for the various classes in these two groups are so similar that sample definitions for one in each group will serve to indicate their general character.

Thus the duties of the Senior Forest Aid, who corresponds to the present Forest Ranger, are to perform, under immediate supervision, minor technical work in an organization engaged in scientific forest research or in the management of forests; and related work as required. Examples of such duties are assisting in forest investigations, or in timber and range estimating; planting; assisting in the preparation of material for timber tests; reading instruments at experiment stations; protecting and handling a minor forest unit. His qualifications are to be training equivalent to that represented by graduation from high school, and not less than two years' experience in forestry work.

The duties of a Junior Forester, who corresponds to the present Forest Assistant, are, under immediate supervision, to perform scientific or technical work of a routine character in connection with the administration of forest areas and the utilization of products therefrom; and to perform related work as required. These duties may involve running boundary lines and mapping forests, involving the use of surveying, measuring, and drafting instruments; directing parties on forest and range valuation work; computing and compiling data for reports or records; inspecting or investigating minor details of forest work, such as forest planting, proper brush disposal, marking of timber on timber sale areas, collecting field data for growth, volume, and yield tables; making routine tests of apparatus, material, or processes. His qualifications are training equivalent to that represented by graduation with a degree from an institution of recognized standing, with major work in the biological or engineering sciences, preferably in botany, silviculture, forest management, or forest engineering.

The statements of duties and qualifications proposed by the Commission follow very closely those suggested by an Advisory Committee composed of representatives of the Forest Service. While the titles used are different from those now in effect, comparatively little change is made in recognized duties and qualifications, the proposals of the Commission serving to crystalize present practice. It is worth noting that in the bill proposed by the Commission for carrying into effect its recommendations, it is provided that whenever the equivalent of graduation from an institution of recognized standing is prescribed as a qualification for a class, the Civil Service Commission shall prescribe as such equivalent a standard or standards based on experience or demonstrated ability in the performance of duties similar to those prescribed for the class which will be accepted as such equivalent. This provision was of course included in order to make certain that men qualified by experience for entrance into the professional classes should not be debarred from them because of the lack of a college degree.

The compensation recommended by the Commission for the various classes of foresters is as follows: Junior forest aid, $840 to $1200 per year; senior forest aid, $1200 to $1800; junior forester, $1800 to $2160; assistant forester, $2400 to $3000; associate forester, $3240 to $3840; foresters, $4140 to $5040.

No salaries were recommended for senior foresters or for the chief of the forest service, these salaries being left for determination by Congress on the recommendation of the Civil Service Commission after consultation

with the head of the department concerned. This arrangement would make it possible for Congress to pay each individual in the highest professional class in accordance with his ability and the responsibility imposed upon him, irrespective of whether he happens to be in administrative or investigative work.

The salaries recommended for the various classes of foresters are the same as those recommended for corresponding classes in the other scientific and technical services, such as the engineering service, biological science service, and physical science service. Taking these services as a whole, the average salaries recommended represent an increase of about $1000 per year for each individual in the group, or of some 40 per cent over the present average. This is the largest percentage increase recommended for any group of employees outside of the teachers in the public schools of the District of Columbia.

As a necessary supplement to its recommendations regarding reclassification and compensation and in order to secure and retain an efficient personnel, the Commission points out that it is absolutely essential that there be consistent application of a wise employment policy providing for the scientific selecting and systematic training of workers, the measurement of individual efficiency, the advancement and promotion of the deserving, the elimination of the ineffiicent, and the retirement of the incapacitated.

FOREST PROTECTION WEEK

A CAMPAIGN to arouse public sentiment for the better protection of forests against fire that became nation-wide was started in the West and rapidly gained headway, it is announced by the Forest Service of the United States Department of Agriculture. The governors of a number of western states issued proclamations designating May 23-29 as "forest protection week," and urged all citizens that they unite their best efforts to prevent and suppress forest fires. In addition the movement had the active support of churches, commercial associations, rotary clubs, schools, fraternal societies, and a number of other organizations. The object of forest protection week was to bring forcibly home to the public the need of care to prevent fires from starting, and of energetic efforts to put out forest fires quickly, if they do start.

The new movement is unprecedented in this country and will be of much importance in safeguarding the Nation's forests and spreading the demand for their better protection, officials of the Forest Service state. The West, they say, is now generally alive to the importance of keeping fire out of the woods. This is partly because of the great value of the present stand of timber, but it is also because of growing recognition of the importance of permanent forests and stable industries.

A large proportion of the fires which have in recent years caused the loss of hundreds of millions of feet of timber in the West are man-caused and preventable. This fact has stimulated a determination to cut down the number of fires. In aggressive action the West has, on the whole, decidedly taken the lead over the East where, in many States, little effort is made to protect the forests against fire.

Proclamations calling for public observance of a week were issued by the governors of Colorado, California, Idaho, Oregon, Utah, Montana, Wyoming, South Dakota and Washington. In New Mexico the governor proclaimed Arbor Day as fire protection day.

A FOREST QUESTIONNAIRE

THE Republican National Committee has sent out a questionnaire, in which among others, opinions regarding conservation of our forests are asked in the following manner.

"Our most pressing conservation question relates to our forests. Out of 850 million acres of virgin timber we have but 150 million left. We have effectually exhausted the timber lands of the Northeast and of the once magnificent forest states of Pennsylvania, Wisconsin, Michigan and Minnesota. About ten years will see the Southeast, which has been our greatest producer of saw timber for years, out of the running as a serious competitor in the lumber markets. Already much of the timber for the thickly populated East and Middle West comes from beyond the Rocky Mountains.

"Ninety-seven per cent of our lumber is cut from privately owned land. Private owners of commercial timber land regularly ignore conservation principles, and have thereby reduced more than 100 million acres capable of growing timber to desolate, unproductive wastes, barren of trees, and worthless for any other purpose. They neither cut so as to insure reproduction, nor will they assist nature by preventing forest fires on cut-over lands. This does not refer to the owners of farm wood lots. We cut annually 100 billion feet of wood. We grow now only 35 billion feet. At this rate we shall exhaust the forests of the Pacific Slope, our one considerable remaining supply, soon, and with certainty. It may be they will last 40 years; it may be 75 years. When the pinch comes, neither wood substitutes nor foreign supplies can relieve the scarcity at home. Only wise and vigorous conservation measures can prevent a grave timber famine—the beginnings of which are already felt.

"The practice of conservation in lumbering, coupled with the prevention of forest fires, will mitigate the coming shortage materially and hasten its cure. The growing of timber on all land in the United States chiefly valuable for that purpose would in time bring the annual

growth up to the present annual consumption.

"Do you favor laws to insure the lumbering of commercial timber without waste, the reproduction of forests on cut-over land, and the protection of all forests from devastation by fire?

"If so, do you favor bringing this about (a) by the nation and the states expanding their forest holdings to cover all commercial timber lands chiefly valuable for forest purposes not conservatively protected and managed by private owners? (b) By the nation and states holding large reserve areas of forest land, and enacting laws requiring private owners to protect and reforest their timber land?

"If the latter, do you favor the enactment of a separate law by each of the states, or one law by the National Congress?

"Do you believe that this country should cut annually more wood than it produces, without making provision for the future?

"If not, what provision should be made for another source of timber supply when the present is exhausted?

"What factors other than underproduction and the growing shortage of standing timber are responsible for the high prices of lumber?

"Do you believe that lumber producers and manufacturers should be permitted, under government supervision, to control overproduction in times of business depression?

"Do you believe that the combination of lumber producers and manufacturers under thorough government supervision, would or would not work both for the good of the industry and the public?

"Mention briefly what are the principal changes needed in methods of taxing forest lands, in order to encourage protection and reproduction and deal fairly with the private owner.

"Is the insurance of standing timber practicable, and, if so, should it be undertaken by private or government agencies?

"If it is true that we are growing annually only about one-third of the timber we use, and that our timber supply must be thus exhausted, do you favor restriction of the export of forest products?

"If forest land is to be bought by either nation or states, should the purchase money be raised by long-term serial bonds, the first series falling due far enough in the future so that timber produced on the land purchased may have opportunity to contribute toward paying the serial bonds as they fall due?"

HELP PREVENT FOREST FIRES

PEOPLE who visit the National Forests during the coming summer can best observe the slogan "Help Prevent Fires," by remembering the "Six Rules," issued by the Federal Forest Service:

(1) Matches. Be sure your match is out. Pinch it before you throw it away.

(2) Tobacco. Throw pipe ashes and cigar or cigarette stumps in the dust of the road and stamp or pinch out the fire before leaving them. Don't throw them into brush, leaves or needles.

(3) Making camp. Build a small camp fire. Build it in the open, not against a tree or log or near brush. Scrape away the trash from all around it.

(4) Leaving camp. Never leave a campfire, even for a short time, without quenching it with water and then covering it with earth.

(5) Bonfires. Never build bonfires in windy weather or where there is the slightest danger of their escaping from control. Don't make them larger than you need.

(6) Fighting fires. If you find a fire, try to put it out. If you can't, get word of it to the nearest United States forest ranger or State fire warden at once.

DO YOU KNOW THIS MAN?

This is the man
That struck the match
That burned the trees
That furnished the logs
That fed the mill
That sawed the boards
That formed the house
That Jack built.

A TREE GAME

1. Which tree a kissing game could play?———
2. And which its father's name could say?———
3. Which shall we wear to keep us warm?———
4. And which do ships prefer in storm?———
5. Which shows what lovelorn maidens do?———
6. And in your hand which carry you?———
7. And which is it that the fruit men fear
 Which makes a call each seventeenth year?———
8. And from their pipes men shake which tree?———
9. Which tree does a bad boy hate to see?———
10. Which like a man bright, dapper, neat?———
11. Which is a girl both young and sweet?———
12. And on which do the children play
 With pail and shovel all the day?———
13. And to which tree shall we now turn
 For goods to wear and stuff to burn?———
14. And now divide you one tree more
 You've part of a dress and part of a door?———
15. Which tree is never seen alone?———
16. And which in church doth office hold?———
17. And which is a town in Ireland old?———
18. For this one do not look so far
 Which tells what charming people are?———
19. The carpenter doth use which tree
 To make his wall as straight as can be?———
20. And to which tree do urchins call
 To show you shouldn't have looked at all?———
21. Which tree on calendars find you?———
22. Which is a joke told times not few?———
23. And on our feet we'll wear which tree?———
24. And which our hero's crown shall be?———
25. Another tree to find just try
 For fish and fuel for a fry?———
26. Now, last of all, what tree have we,
 The first an animal faithful indeed,
 The second our country's industrial need?———

(The answers will be published in the August issue of AMERICAN FORESTRY.)



Underwood & Underwood.

PLANTING BY MISSOURI WOMEN'S CLUB

This tree was planted by the Missouri Women's Club of New York City, near Grant's Tomb on Riverside Drive, in honor of David Rowland Francis, former Governor of Missouri and former Ambassador to Russia. Each year the club plants a tree in honor of some famous Missourian.



Underwood & Underwood.

TREE PLANTING IN HONOR OF DEAD MARINES

In memory of the gallant Marines who have "gone west," mothers of the Marines marked "Mother's Day" in New York City by planting memorial trees in honor of the sons who gave their lives to their country in the World War. The trees were placed on The Mall, in Central Park, with very impressive ceremonies.

MORE TREES TO HONOR OUR HERO DEAD

TO the University of Illinois goes the honor of being first in 1920 to set before the country on a big scale what a college can do in memorial tree planting. One hundred and seventy-three trees have been planted in honor of her dead. Of course it is to be remembered that Illinois is a big school and consequently her percentage of "heroes gone west" totals higher than some other institutions of learning. It in no wise discredits other schools for the fine spirit is the same in all. It just so happens that Illinois has the ground on which to do something on a very impressive scale. Other colleges have taken up the memorial tree planting idea. At the University of Washington, on the far west coast, plans are now being made for memorial tree planting next Armistice Day under the direction of Carl Gould, the university architect. The O. A. C. Forestry Club at the Oregon Agricultural College, Corvallis, Oregon, has dedicated three scarlet oaks to the memory of members of the Club. The dedication was by H. S. Newins, associate professor of forestry, and the trees were for E. B. Blackden, Owen W. Johnson and Richard W. Wilmot. Johnson was with the Twentieth Engineers.

At Urbana the University of Illinois carried out a program of unusual merit. The trees were marked with the bronze marker designed by the American Forestry Association and registered on the honor roll. The *Daily*

The University and the State are grateful for this sublime attempt on the part of the students of the University to keep alive the names and deeds of their fallen comrades.

—Dean Davenport of the College of Agriculture.



UNIVERSITY OF ILLINOIS MEMORIAL TREE PLANTING

The University of Illinois honored her hero dead by planting memorial trees and registering them on the honor roll of the American Forestry Association. The diagram shows the marker as pictured on the front page of the official program and the way the trees have been placed as part of the scheme for the Military Drill Field.

Captain Babbitt read the names of the Illinois dead. As these names were read the student brigade was brought to present arms and the civilian portion of the crowd stood with bared heads. The trees were planted along the terrace in front of the Armory, down South Sixth Street, extended to the cavalry stables, and then west across the drill field to South Fourth Street. They were planted in an avenue 40 feet wide, with a distance of 50 feet between the trees in the rows. Groups of trees were also planted at both ends of the Armory. Each tree bore a nameplate for the man it represented. Tug Wilson, president of the Union, appointed the following to carry out the work: P. A. Niebergall, chairman, George Buchannan, G. E. Milner, S. D. Owne, R. S. Firebaugh, R. W. Slocum, C. V. Arnold, C. E. Baker, F. E. Carver, R. W. Lambert, C. C. Shade, Helen Van Inwegan, L. L. Corrie, H. R. Bowditch, R. G. Carlson, Ray Dodge, L. M. Patton, L. S. Holler, V. T. Belloff, R. V. Watson, W. M. Kimmelshue, G. C. Sprague, B. S. Pickett, C. F. Hottes, W. Trelease, F. N. Evans, C. Crandall, H. B. Dorner, A. W. Jamison, W. A. Ruth, W. F. Handschin, W. P. Flint, A. S. Colby, W. S. Brock, H. B. Tukey, J. C. Blain, J. W. Lloyd, A. E. Atkinson, and Miss Mary E. McAdams.

Illini "covered the story" in fine fashion. The exercises were followed with a call for editorials on tree planting from the School of Journalism and these were sent throughout the State as a part of the campaign of education.

The United Daughters of the Confederacy at Fort Smith, Arkansas, have paid a graceful tribute in memorial tree planting to the Red Cross and to the Y. M. C. A. Twenty magnolias have been placed in the form of a cross and three in the shape of a triangle as a mark of esteem for the two organizations. More tree planting is to be carried out



NINE TARRYTOWN HEROES HONORED

On the lawn of the North Tarrytown, N. Y. High School, nine memorial trees have been planted in honor of pupils who gave their lives to their country. Addresses were made by Justice Winfield L. Morse, of the Board of Education, and by Frank L. Young, County Judge. The trees were planted in memory of Daniel Clemons, John A. Kelly, Alcon H. Levy, Kenneth Pollock, Maurice Powers, Michael Santz, Harold Scofield, Howard Slawson and Lester Storms.



National Photo "ARLINGTONS IN FRANCE"

Such impressive scenes as marked the dedication of the amphitheater at Arlington will be repeated some day in France, when the War Memorials Council, appointed by Newton D. Baker, the Secretary of War, shall have completed its labors. The plan in prospect provides for caring for the graves of the heroes who gave their lives for humanity. There are to be memorial trees and roads of remembrance in the scheme which includes at least three resting places, and the American Forestry Association has been appointed a member of the Council by the Secretary of War



National Photo

ONE OF THE TREE PLANTINGS ON THE FIRST ARBOR DAY OBSERVED BY THE DISTRICT OF COLUMBIA

To mark the first Arbor Day celebrated in the District of Columbia, the Forestry Committee of the District Federation of Women's Clubs planted a tree in Rawlings Park on May 4th, in honor of the memory of J. Sterling Morton, the father of Arbor Day. Secretary of Agriculture E. T. Meredith made an impressive address, and Colonel C. W. Kutz, the engineer commissioner of the District, presented the tree to Dr. S. M. Huddleson, chairman of the Forestry Committee. Each club president placed a shovel full of earth on the roots of the tree.

in the fall. Mrs. Maggie Haines, of the United Daughters of the Confederacy, writes the Association and calls attention to the fact that "the magnolia is on dress parade the year around." At Tuscaloosa, Alabama, the United Daughters of the Confederacy in co-operation with the American Legion and veterans of other wars, have planted willow oaks in a double grove that connects the University with Tuscaloosa. The American Legion is taking up memorial tree planting everywhere and co-operating in the tree day program that is being sent out by the American Forestry Association.

At Warren, Pennsylvania, on Memorial Day, people from every corner of the county gathered for the memorial tree dedication in honor of the county's heroes. Mrs. Silas E. Walker, of the Daughters of the American Revolution, was chairman of the Memorial Park Committee. At Scranton, Pennsylvania, an impressive memorial tree dedication marked Memorial Day. Mrs. Grace Storrs Watson, of the Scranton Shade Tree Commission, registered the trees planted with the American Forestry Association.

To every section of the land the educational campaign of the American Forestry Association has carried the message of the value of trees. The idea of the municipal wood lot is also being carried far and wide. An example of this is reported by the Hymera High School of Indiana. This report follows:

"The High School in co-operation with the grades, the district schools and the public has set out the vacant lot east of the present high school as a grove in young forest trees. This lot was formerly a part of the old White Ash Coal Mine and is low ground with many sink holes, making it unfit for cultivation. Township Trustee E. A. Marratta conceived the idea of setting it out in young forest trees, thus providing an ample grove for future generations. He presented his idea to the Jackson township teachers who accepted it with enthusiasm and appointed Miss Eleanor Stewart, teacher of Botany and Agriculture in the Hymera High School, and Miss Nell Farley, Agri-



PLANTING 173 MEMORIAL TREES AT THE UNIVERSITY OF ILLINOIS

This photograph shows the speaker's stand and the trees, covered with canvas. At a signal, each tree captain stepped up for his tree and with his crew of five men planted it. Some parents came over 150 miles to attend this exercise. Each tree was marked with an American Forestry Association marker.

cultural teacher in the grade school, to supervise planting.

"The high school science classes were put to work on a study of forestry and especially on trees adapted to low ground. Surveys were made and plans drawn of the ground, then the placing of the trees worked out. County Agricultural Agent H. S. Benson was called in and gave some valuable suggestions. The plot was then staked off, the ground divided and apportioned



National Photo

SECRETARY BAKER SPEAKS IN MEMORY OF THE HEROES

To every war mother in the land comes the opportunity to have a great part in the memorial resting places that will be established in France by the War Memorials Council. The Secretary of War, shown speaking at the dedication of the amphitheater at Arlington, has just appointed the Council which will have charge of this great work. In these "Arlingtons In France," the mothers of the land will find a fitting resting place provided for their sons.

to the various grades. All the boys of the high school and in the sixth, seventh and eighth grades participated in wielding the spade. The classes both at the grade and high school went to the woods and secured trees. About two hundred trees were planted, selections being made from the local forest trees. Among those used were soft and hard maple, oaks, walnut, beech, ash and sycamore. Many good specimens were brought in. The high school agricultural class has since gone over the field trimming and replacing."

The American Forestry Association congratulates Jackson township and her citizens who have enlisted in such a worthy cause; a cause in which an abandoned coal mine site has been put to work. Who knows the



Photograph by Murray Studio

145 ROADSIDE TREES PLANTED

The Lodi California Women's Club claims the honor of having started the first Road of Remembrance in California. Mrs. May Crocker, a member of the American Forestry Association, and chairman of the Conservation Committee of the Alameda District of the California Federation of Women's Clubs, reports that the planting has just been completed with the placing of 145 trees for one mile and a half out of Lodi.

value of such work? Only time can tell. The tree planter reaps a reward *now* despite what some folks may say. His reward is satisfaction in having made the world a better place to live in for those who come after him.



BROOKLYN HEROES HONORED

Four memorial trees have been dedicated by the Lexington Council No. 293, of the Knights of Columbus of Brooklyn, in honor of the heroes of that organization. The members of Leyhanack Post, of the American Legion, attended the ceremony, at which Father William B. Collins, of St. Anthony's Church, blessed the trees. The trees stand in honor of John Christopher Sheehan, George Alphonsus Black, Francis James Foley and Thomas Raymond Nulty. In St. Anthony's Hall, Dorothy Nulty unveiled a tablet to the four heroes. Right Reverend Monsignor O'Hare, Joseph J. Hollowell, Samuel J. Toomey, Grand Knight, and Judge J. Gratton McMahon were the speakers at the impressive ceremony.

FACTS ABOUT DEPLETION OF OUR FORESTS

THAT the high cost of lumber and newsprint is due in no small measure to the using up of the forests east of the Great Plains was stated by the Secretary of Agriculture in forwarding to the Senate a report by the Forest Service on timber depletion, called for by resolution of Senator Capper.

This resolution requested information on: the depletion of timber in the United States; the effect of timber depletion upon the high cost of materials; the effects of lumber exports upon domestic industries, and the effects of depletion upon the concentration of timber ownership and manufacture and the relation of such concentration to the public welfare.

The outstanding facts reported by the Forest Service are:

That three-fifths of the original timber of the United States is gone and that we are using timber four times as fast as we are growing it. The forests remaining are so localized as greatly to reduce their national utility. The bulk of the population and manufacturing industries of the United States are dependent upon distant supplies of timber as the result of the depletion of the principal forest areas east of the Great Plains.

That the depletion of timber is not the sole cause of the recent high prices of forest products but is an important contributing cause whose effects will increase steadily as depletion continues.

That the fundamental problem is to increase the production of timber by stopping forest devastation.

The virgin forests of the United States covered 822 million acres. They are now shrunk to one-sixth of that area. All classes of forest land, including culled, burned, and cut-over areas, now aggregate 463 million acres, or a little more than one-half of our original forests. Of the forest land remaining and not utilized for farming or any other purpose, approximately 81 million acres have been so severely cut and burned as to become an unproductive waste. This area is equivalent to the combined forests of Germany, Denmark, Holland, Belgium, France, Switzerland, Spain and Portugal. Upon an enormous additional area the growth of timber is so small in amount or of such inferior character that its economic value is negligible.

Secretary Meredith most earnestly requests consideration of the practical measures proposed for putting a stop to forest devastation and restoring our idle land to timber production, and emphasizes especially the immediate urgency of legislation (1) which will permit effective co-operation between the Federal Government and the several states in preventing forest fires and growing timber on cut-over lands, and (2) which will greatly extend the National Forests. Enlargement of the National Forests offers immediate relief. On these publicly administered areas, high quality timber can be grown and utilized to the maximum advantage; regrowth will follow cutting; and, under the regulations of the Forest Service, the disposal of timber will foster competitive conditions in the lumber industry. These steps are the foundation of an effective national policy for insuring a permanent and adequate supply of timber.

Concurrently with these measures, a comprehensive survey of the forest resources of the United States should be made.

The merchantable saw timber remaining in the United States is estimated roughly at 2,215 billion board feet, something less than three-fourths of which is virgin stumpage. The rest is second growth of relatively inferior quality. About one-half of the timber left is in the three Pacific Coast States and over 61 per cent is west of the Great Plains. A little over one-fifth of the timber left in the country, 460 billion board feet, is hardwood.

There is now consumed or destroyed annually in the United States 56 billion board feet of material of saw timber size. The total yearly consumption of all classes of timber is about 26 billion cubic feet. Our depleted forests are growing less than one-fourth of this amount. The United States is not only cutting heavily into its remaining virgin forests every year. but is also using up the smaller material upon which our future supply of saw timber depends much more rapidly than it is being replaced.

The two striking effects of timber depletion already apparent are:

The injury to large groups of wood users and to many communities resulting from the exhaustion of the nearby forest regions from which they were formerly supplied; and, the shortage of timber products of high quality.

Less than five per cent of the virgin forests of New England remain and the total stand of saw timber in these States is not more than one-eighth of the original stand. New York, once the leading State in lumber production, now manufactures only 30 board feet per capita yearly, although the requirements of its own population are close to 300 board feet per capita. The present cut of lumber in Pennsylvania is less than the amount consumed in the Pittsburgh district alone. The original pine forests of the Lake States, estimated at 350 billion feet, are now reduced to less than 8 billion feet, and their yearly cut of timber is less than one-eighth of what it used to be. These four densely populated regions, containing themselves very large areas of forest land, are now largely dependent upon timber grown and manufactured elsewhere and are becoming increasingly dependent upon timber which must be shipped the width of the continent. The bulk of the building lumber and

structural timbers used in the Eastern and Central States during the last fifteen years was grown in the pine forests of the south. The virgin pine forests of the South Atlantic and Gulf States have been reduced from about 650 billion board feet to about 139 billion feet. The production of yellow pine lumber is now falling off and within ten years will probably not exceed the requirements of the Southern States themselves.

The United States at one time contained the most extensive temperate zone hardwood forests in the world. One region after another has been cut out. The production of hardwood products on their past scale can not be long continued. The scarcity of high grade oak, poplar, ash, hickory, walnut, and other standard woods is now placing many American industries in a critical condition.

The depletion of forest resources is not confined to saw timber. Since 1909, the country has ceased being self-supporting in newsprint paper and now imports two-thirds of the pulp, pulpwood, or newsprint which we require. This condition is due in part to timber depletion, in part to failure of the paper industry to expand in our western forest regions as the lumber industry has expanded. In 1919 the production of turpentine and rosin had fallen off 50 per cent. Within ten years the United States will lose its commanding position in the world's market for these products and may, in time, be unable to supply its domestic requirements.

The termination of the war found the lumber industry with depleted stocks. Production during the war had been much less than normal on account of shortage of labor and equipment and embargoes on transportation. A large part of the lumber produced had been taken by the government for war purposes. During the same time, the normal construction of dwellings and industrial structures and the use of lumber in many manufacturing industries had been greatly curtailed. Following the war, these pent-up demands were released. They caught the lumber industry not only with its stocks short and broken from war conditions but unable, on account of labor difficulties, lack of freight cars and bad weather in important producing regions, to respond rapidly with increased production. Aside from the general causes affecting prices of most commodities, the expansion of credit accompanied by currency inflation and the wave of speculation and extravagance—an "auction" lumber market would no doubt have resulted from the frenzied competition of buyers to obtain the limited stocks available, wholly inadequate to satisfy current demands.

Under the combined influence of the general conditions making for high prices and this situation in the lumber industry itself, prices rose to unprecedented limits. In March, 1920, average mill prices in the South and West had increased 300 per cent and more over the prices received in 1914, and average retail prices in the Middle West showed increases ranging from 150 to 200 per cent. In the case of high quality hardwoods and other specialized products, the average advance in eastern wholesale markets was from $200 to $250 per thousand feet, and the demand at this advance was still unsatisfied.

The timber market has been more unstable than ever before in our history. Many industries have been unable to secure their supplies of timber at any price. The output of certain entire industries has been reduced as much as 50 per cent. A large speculative element has been introduced into the sale of lumber. Middlemen and manufacturers of wooden commodities have been able to pass on to the consumer and even augment any price they might pay. Necessities have fared worse than luxuries. The ramifications of lumber shortages and high prices are limitless and have affected seriously practically our entire population.

Obviously these lumber prices bear no relation to the cost of production and distribution. While the costs of production in the lumber industry have at least doubled as compared with 1916, lumber prices have much more than doubled and have become wholly disproportionate to operating costs. Excessive profits have been made by the industry. The division of these profits between manufacture and distribution has varied in accordance with circumstance and the ability of the various elements in the industry to dominate the situation. That prices have been too high is recognized by the best thought in the industry; and some manufacturers have sought to stabilize the market.

The depletion of timber in the United States has not been the only cause of these excessive prices on forest products, but has been an important contributing cause. It has led to the migration of both the softwood and hardwood lumber industries from region to region and each is now cutting heavily into its last reserves. The exhaustion of timber in nearby forest regions has compelled many large lumber consuming centers to import supplies from greater and greater distances. The wholesale prices on upper grades of softwood lumber in New York were from $20 to $25 per thousand prior to 1865 when mills in the same State supplied this market, from $35 to $45 between 1865 and 1917 when most of the supply came from the Lake States and the South, and are now entering a general level of $130 a thousand feet with a large part of the material coming from the Pacific Coast. In the Middle West, the building grades of white pine lumber cut in Michigan, Wisconsin, and Minnesota, retailed at $15 to $20 per thousand feet prior to 1900. As lumber from the Lake States became exhausted and southern pine took over this market, the retail prices rose to a level of $25 to $35 per thousand feet. The replacement of southern pine by West Coast timbers now in progress is initiating a new price level of about $80 to $85 per thousand feet. The increased cost of transportation is but one factor in these new price levels, but it is an important one. The freight bill on the average thousand feet of lumber used in the United States is steadily increasing as the sawmills get farther and farther away from the bulk of the lumber users.

Much information is available to show the disadvantage of the lumber consumer whose nearby forests have been exhausted. Retail prices in the Ohio Valley, for ex-

ample, on certain grades exceed retail prices on the identical grades in Oregon in some instances by as much as $50 per thousand board feet after allowing for all transportation costs. The curtailment of lumber output in the eastern regions not only has compelled the average consumer to pay more for freight but has enhanced the effects of congestion in transportation and of climatic and other factors limiting the production in regions which still support a large lumber industry. It has restricted opportunity for competition and thereby increased the opportunity of the lumber manufacturer or dealer to auction his stocks for higher prices. In other words, the effects of forest depletion can not be measured in terms of the total quantity of timber remaining. Its injury is felt particularly through the steady process of regional exhaustion. Our remaining timber is so localized that its availability to the average user of wood is greatly reduced. Particularly does such a restricted location of the timber supplies assume a serious national aspect in the face of transportation congestion and inadequate transportation facilities such as the United States is now experiencing. Had the forests and forest industries of the Eastern States still existed, the opportunities for regional competition in supplying the lumber markets and the wider distribution of lumber transport undoubtedly would have afforded a curb upon rising prices which did not exist in 1919.

The export trade in lumber does not have a serious bearing upon timber depletion from the standpoint of quantity; but does have an important bearing upon the duration of our limited supply of high grade timber, particularly of hardwoods. The exports of high grade oak, walnut, hickory, ash, and other woods essential to many industries in the United States which now seem probable will further enhance the shortage of such products for the domestic market and the tendencies already evident toward sustained high prices. On the other hand, the United States imports from Canada about two-thirds of its total consumption of newsprint or newsprint materials. The effects of our export trade in lumber should be considered from the standpoint of the specific timber grades or products whose depletion is most imminent and threatening to American industries.

The concentration of timber ownership has not changed materially since the exhaustive report made upon this subject by the Bureau of Corporations in 1910. One-half of the privately owned timber in the United States is held by approximately 250 large owners, the ownership of the remaining timber being very widely distributed. The tendency toward the acquisition and speculative holding of timber beyond operating requirements has been checked and the present tendency is toward the manufacture of large timber holdings. At the same time, the lumber industry, particularly in the Western States, is going through a partial reorganization into larger operating and marketing groups. In this there is a tendency for small mills to disappear and small timber holdings to be blocked into larger ones adapted to extensive lumber manufacture. While there is still a large number of individual timber owners and of sawmills operating as separate units, the larger interests are acquiring a more dominant place in lumber manufacture in the West. It is to be expected that these large interests or groups will maintain, as time goes on, a fairly constant supply of timber for their manufacturing plants by acquiring smaller holdings. No information is at hand which justify a conclusion that monopolistic conditions on any general scale have grown out of this situation. There are many instances to the contrary. On the other hand, the degree of control of the timber remaining in the United States exercised by a comparatively small number of large interests will steadily increase as timber depletion continues, approaching a natural monopoly in character, and this control will extend particularly to the diminishing supply of high grade material.

In 1918 our per capita consumption of lumber was about 300 board feet. The homes and industries of the United States require at least 35 billion feet of lumber yearly, aside from enormous quantities of paper and other products of the forest. A reduction in the current supply of lumber below this figure would seriously curtail our economic development. Appreciable increases in lumber imports are not possible except at excessive prices. We can not afford to cut our per capita use of lumber to one-half or one-third the present amount—to the level of European countries where lumber is an important luxury. We must produce the great bulk of the timber which we need ourselves and we have the resources for doing so.

The solution of the problem presented by forest depletion in the United States is a national policy of reforestation. Increased and widely distributed production of wood is the most effective attack upon excessive prices and monopolistic tendencies. Depletion has not resulted from the use of forests but from their devastation, from our failure, while drawing upon our reservoirs of virgin timber, to also use our timber growing land. If our enormous areas of forest growing land, now idle or largely idle, which are not required for any other economic use, can be restored to timber growth, a future supply of forest products adequate in the main to the needs of the country will be assured.

CHANGE OF ADDRESS

It is urgently requested that all changes of address, whether temporary or permanent, be sent in promptly.

Both the old and new address must always be given.

Such co-operation will be helpful in avoiding the loss of magazines.

"THE AMERICAN FORESTRY ASSOCIATION

IN the words of an editorial in the *Buffalo Courier* "the American Forestry Association still sticks pluckily to its fight" for a national forest policy. This is but an example of the hearty co-operation on the part of the newspapers of the country with the American Forestry Association. They too are "sticking" with a right good will and are taking up forestry from every side. The *Buffalo Courier* puts this head on its editorial "What's the matter with Congress?" and says:

The American Forestry Association sticks pluckily to its fight for the passage of the senate bill authorizing the Secretary of Agriculture to make a survey of pulp woods on the public domain. It refuses to be discouraged by the failure of the last Congress to do anything in the matter.

In view of the increasing paper shortage the indifference of Congress to the whole paper question is hard to understand. Weeks ago the senate adopted a resolution authorizing the President to appoint a commission to take up the paper question with the dominion as well as provincial authorities of Canada, but the house has done nothing about it.

The proposed senate bill authorizes the Secretary of Agriculture (that means the forestry bureau) to make a survey of the classes and kinds of timber on the public domain (including the national forest, Indian and other reservations), which are suitable for pulp wood for newsprint and other forms of paper; also to report to Congress upon the present conditions in respect to the current consumption and protection of pulp woods.

Ten years ago the United States produced nearly all its supply of pulp wood; now two-thirds of it is imported. So rapidly has a change come about that only one-third of the newspaper issues last year in this country were printed on the product of American forests.

This fact alone should stir Congress to action—at least to the point of finding out "where we are at," what will be the probable condition in the near future and what it is possible to do to better the outlook.

Some of the other editorial opinions follow:

Detroit Free Press: The American Forestry Association has issued an appeal to the Federation of Women's Clubs of several States urging a special tree-planting campaign for Arbor Day. The rapid disappearance of trees along our city streets, due to the natural processes of decay and death and the inroads of the ax clearing the way for business suggests that Arbor Day should be observed in a practical way.

Nashville Banner: The late Senator John H. Bankhead, of Alabama, was the author of legislation that provided Federal aid to road building. The senator had a practical turn of mind and always took great interest in projects of public improvement. He recognized the necessity for good roads and devoted much of the energy he put into his work in Congress to measures favoring highway construction.

It is natural and altogether proper that a Bankhead Memorial Highway should be suggested. In a telegram sent to Judge B. M. Allen of Birmingham, Alabama, president of the Bankhead Highway Association, Chas. Lathrop Pack, president of the American Forestry Association, urges that the Bankhead Highway be made a "road of remembrance" in honor of the late senator, who did so much for good roads not only in the South, but throughout the country. The suggestion is apt and appropriate. John Hollis Bankhead did Alabama long and valuable service, and in the matter of highways, as well as in other respects, the nation is his debtor.

WHEN YOU ARE GONE

Fort Lauderdale Herald.

Plant a tree. You found several here when you landed on this old earth and you've seen a great many cut down during your time. You have probably cut down a few yourself. The children who are born after you have passed on have a right to find a few trees standing. But they will not if every person who passes through this vale of tears cuts down a few and forgets to plant any. Plant a tree. Plant a dozen of them, and then you will have done something for the generations who follow you, even as some one did something for you ages ago.

Rochester Democrat and Chronicle: Interest is being renewed in the project of planting trees in memory of those who gave their lives for civilization and the safety of their country in the World War. This movement, which has the active backing of the American Forestry Association, has reached proportions far in excess of what seemed likely at its inception. Nor is it necessary that the tree memorial be to the soldier dead. Boy Scouts are planting trees in honor of Theodore Roosevelt. Families are starting memorials to their loved ones which may well be flourishing monuments of living green long after cunningly cut stones would have crumbled into dust.

Generally speaking, there is nothing and no person deserving of a memorial monument that cannot be appropriately marked by a tree of remembrance. And there is something peculiarly fitting in such a memorial. When a memorial stone is erected, the only close relationship those erecting it have with the object itself is through the medium of the pocketbook. Their share in the memorial begins and ends with paying for it. Even in choosing they are generally limited to a few patterns, much as if they were out to buy a suit of clothes.

With trees it is vastly different. In the first place there is the selection of the kind for planting. In this there is an opportunity for planting a tree which will reflect the characteristics of the one or ones whose memory it will keep green. Then there is the opportunity to cultivate this tree from year to year, to make it develop the best that is in it in the way of beauty. In doing this it is as if one were working day by day and year after year in building a monument worthy of the object of such attention.

And when it comes to a memorial to the soldier dead, what on earth could begin to equal a fine parkway with its array of trees of remembrance? Not only would such a memorial be a thing of beauty and a joy for many generations, keeping fresh the memory of heroes of the world's great crisis, but it would be a source of comfort in the heart of summer to countless thousands; perhaps it would save the lives of many in the course of its existence. The soldiers died that those whom they loved might live. This memorial to them would live and bring new life to those whose freedom was won by the death of heroes.

By all means let us have trees of remembrance. Let us have them abundantly and for every possible memorial. They are the true monuments, the living memorials God has provided to hallow the holiest memories of every person and of every race.

Salt Lake Tribune: For several years past the American Forestry Association has been trying to prevent waste in the forests. Some improvement has followed the good work, but reforestation has not become general by any means, and much remains to be done. A Minnesota lumberman calls attention to the situation in these words:

STILL STICKS PLUCKILY TO ITS FIGHT"

"A timber famine is near. There are no substitutes for wood pulp and wooden ties and many other essentials of the industry. Nature cannot build a commercial forest in a million years unaided by law, against axes and fires, as they devastate now. Minnesota's most rapidly growing lumber forest cannot attain commercial maturity within fifty years in any event. Southern pine's exhaustion in many areas is only a decade and a half away, and the west coast will not last half a century. Germany and Massachusetts proved reforesting large tracts the surest of highly profitable long-term investments. Western States must get busy."

The advice to the western States is sound and should be followed.

Indianapolis Star: A good many trees have been planted here and there over the country by way of memorializing American soldiers who gave up their lives in the war. Mostly they are for individuals—a single tree set in a place somehow associated in his lifetime with the one who is gone. A number of groves or parks and stretches of roadway are planned to be planted in groups or in rows in honor of the fallen ones of certain communities. They call them "memory trees," which is a good name.

Of the single trees an illustration is one planted by pupils of the Force School in Washington, which was attended by Quentin Roosevelt when he was a young boy. He was the only former pupil to lose his life in the world war. A committee of twelve formed by appointment of a member from each class, will have care of the tree; as each member graduates from his class he appoints a member from the incoming class to take his place. Thus there will always be a committee at the school to look after this tree.

The trees planted at the Technical High School in Indianapolis were in honor of former pupils in the service and not for the dead. Women's clubs, highway associations, State forestry associations, and the American Forestry Association are taking an active interest in the movement. No more beautiful way of paying tribute to the boys who went to war could be devised than the planting of trees, and it is an undertaking to be encouraged. Memory trees, singly or in groups, or along "roads of remembrance" will be known for what they are quite as well as a carved monument and may be far more beautiful. But no memorial of the kind should be established unless arrangements for its future care are also made. We want no neglected memory trees.

Grand Rapids News: The American Forestry Association is heart and soul with the Massachusetts Forestry Association, as it is in sympathy with every move to conserve and to build up our forests. A national forest policy is imperative. The States should work in conjunction with the federal government, which already has completed several great undertakings calculated to increase the tree acreage of the country.

THE WOODPILE

By Henry L. Stoddard, in N. Y. Evening Mail.

After all is said and done, the newsprint situation goes straight back to the woodpile.

That fixes the limit of supply. Newspapers have been used to basing their paper contracts on their needs; even in the crisis of the past four months it has not been possible to bring publishers to realize that the size of the woodpile is now and will be hereafter the determining factor in paper supply.

And the woodpile is fast disappearing. No longer is it just a step from the mill door; to comes over the rails now practically to every mill, and the haul grows constantly longer and dearer.

Newspaper publishers are not the only persons in the world who stand a lot of punishment before they abandon a habit; that is what they are doing so long as they regard the situation from their office viewpoint.

In ten years' time we have driven into Canada two-thirds of an industry that was in 1910 wholly our own!

We have wasted our resources like a spendthrift son; it is not a famine we face—it is an exhausted source of supply.

The big thing to do, of course—the essential thing to do, sooner or later—is to unite on a policy operative AT ONCE to reduce consumption, and to unite also on a programme that will restore our forest lands to productivity. There is enough land to grow all the timber needed for the nation's requirements: the trouble is that the timber is not there. Let us put it there; let us make the newsprint industry an American industry once more.

At this time, when lumber prices have soared to almost unheard-of altitudes, it ought not to be difficult to arouse the interest of every citizen in forestry.

Macon, Georgia, News: Of all the monuments that will be erected to the memory of our heroic dead, none will be more appropriate or impressive than the great forests, planted from American seed, that are to lift their heads on the battlefields of France.

The offer to supply these seeds was made by the American Forestry Association, and M. Jusserand, French Ambassador at Washington, has just expressed to that Association the thanks of the French Minister of Agriculture for the gift, with the assurance that the seed of the Douglas fir —one of the noblest of our American trees —will be sent to the departments of the Aisne, the Oise, the Ardennes and the Somme, for the reforestation of the region devastated by the war. The seeds of the leafy trees, such as oak, ash and poplar, will be sown this spring in the nurseries of the same school as that of Nancy.

Said Hamlet of Ophelia, in words of the most haunting melody in literature:

"Lay her i' the earth
And from her fair and unpolluted flesh
May violets spring."

So, too, these trees which had their birth on American soil will be literally fertilized by the blood of some of the best and bravest of our sons who fought and died on the sanguinary fields of France in the mightiest struggle of all time.

And no memorial that could possibly be devised appeals more strongly to the sentiment and to the sound judgment of the American people who see in the plan a wise provision to supply stricken France with the forests of which she stands in such need, and at the same time we provide a memorial to the dead, nurtured by their very life-blood, which shall typify the freshness and vigor of the American manhood offered up in sacrifice that the world might be freed from the German menace.

Who does not remember the lines of Byron on the field of Waterloo?

"And Ardenne waves above them her green leaves,
Dewey with nature's tear drops, as we pass,
Grieving, if aught inanimate e'er grieves,
Over the unreturning brave."

Through all the years to come these noble forests in France, seeded from American soil, will bear living testimony of American heroism and at the same time will help to repair the devastation of the Huns.

Keokuk Constitution Democrat: The vital importance of maintaining the lumber supply is shown by one simple fact, brought out by the American Forestry Association, that there are more than fifty thousand wood-using plants in the United States, employing more than a million persons, and having an invested capital of three billions of dollars.

STATE NEWS

CALIFORNIA

THAT camping, now recognized as a national pastime, has reached its highest development in the National Forests of California, is the opinion expressed by District Forester Paul G. Redington. For proof, Redington points to the fact that in California, where the free automobile campground originated, there are today a greater number of more attractive mountain campgrounds than in any other one State.

"There is, moreover, no question as to the popularity of these campgrounds, nor of the National Forests as California's recreation grounds," he says, "for last year more than 800,000 people camped within them. And this year members of the camping fraternity will find new camps prepared for their convenience.

"In fact the demand for campgrounds equipped with some of the simpler modern conveniences has so far outstripped the financial resources of the Forest Service that we were threatened at one time with the possibility of being unable to care for this year's crop of recreationists.

"Fortunately, however, public and semi-public organizations including Boards of Supervisors, Chambers of Commerce, Automobile and Motor Car Dealers' Associations, and even, in some cases, individual motor car dealers, realizing the big opportunity for public service, have come to our aid. In the last two months, some $10,000 has been contributed from such sources and the work of installing the new camps is now progressing in full swing."

LOUISIANA

A SPECIAL legislative committee of the Louisiana Forestry Association, besides taking the action referred to in the editorial section of this issue, also approved changes in the present reforestation law of the State, liberalizing several of its terms. The present law permits a land owner whose holdings are not assessed at more than $5 an acre to enter into a contract with the State Department of Conservation requiring the owner to reforest his lands; in return for the owner's effort at timber growing, the State agrees to reduce the taxes upon the land to $1 an acre for a period of 30 to 40 years, and to keep them at this level throughout the contract period. The amendments proposed raise the $5 limitation to $10, and permit contracts for as short a term as 15 years. The assessment placed upon the land under a 15-year contract is $3.50, however, and is reduced by 50c. for each 5-year period in excess of 15 years, down to the present rate of $1 per acre for 40 years. Other minor changes in the laws were also approved.

The legislative committee which made the above recommendations for amendments and additions to the forestry laws was authorized and appointed at the spring field meeting of the Louisiana Forestry Association held at Urania, Louisiana, on May 6. On that day about 200 persons were the guests of President Hardtner, of the Forestry Association at an open-air meeting and picnic lunch near Urania. The meeting which was the most successful in the history of the Louisiana Forestry Association, was featured by addresses by President Hardtner, M. L. Alexander, Commissioner of Conservation, State Forester E. O. Siecke, of Texas, R. C. Bryant, President of the Society of American Foresters, Professor J. G. Lee, of the State University, and Miss C. C. Dorman, Chairman of the Forestry Committee of the Louisiana Federation of Women's Clubs. Before and after the meeting, inspection trips were made of the reforestation and experimental work being done at Urania by Mr. Hardtner, the State Department of Conservation, and the United States Forest Service. The senior class of the Yale Forest School, which is undergoing its final training at Urania, were among the many interested guests of the association.

At the business meeting in the afternoon, President Hardtner and Secretary R. D. Forbes were unanimously re-elected, and vice-presidents and an executive council, together with special committees, were newly named, after an interim of three year's comparative inactivity in association affairs, due to the war.

The Louisiana legislature is now in session at Baton Rouge, and with the Hon. John M. Parker, a life-long conservationist, in the governor's chair, prospects are very bright for the progress of forestry in Louisiana. A feature of the new governor's financial program, whereby large additional revenues are to be raised for the support of a Great Agricultural College and bettered state institutions, is the 2 per cent levy advocated by Gov. Parker on all of the natural resources of the state. This levy is to be placed upon these resources at the time of their utilization, and the revenue derived is expected to be about $3,000,000. In the case of forest products, the 2 per cent tax is levied upon stumpage valuations at the time of cutting, and it is anticipated that between $400,000 and $500,000 will be raised in this way. The present tax upon forest products, which was the first levied by any state in the Union, amounts to only about $65,000 a year. At present, one-fifth of the so-called severance tax on forest products goes to the support of the forestry work of the Louisiana Department of Conservation, and while the same ratio may not be maintained with the greatly increased tax, the new governor has announced himself in favor of a substantial appropriation for forestry work. The governor's 2 per cent tax on natural products is very popular, and has been agreed to by all of the large users of natural products, including not only the lumbermen, but the oil and gas interests. It is not likely, therefore, that the governor's program will meet with any substantial opposition in the legislature.

NEW JERSEY

THE New Jersey Department of Conservation and Development has just published an attractive and well illustrated circular entitled "Why Forestry in New Jersey," which presents the subject of forestry in a popular form.

It aims to bring about a greater appreciation of the latent value of the State's woodland, to the end that it may be protected from fire and abuse, and developed by proper management into a profitable resource.

Attention is called to the State Forests in North and South Jersey, which are maintained for the purpose of demonstrating the practicability and benefits of forestry practice. The public is encouraged to seek State aid in woodland improvement, forest planting, marketing of products, as well as in the planting and care of shade trees.

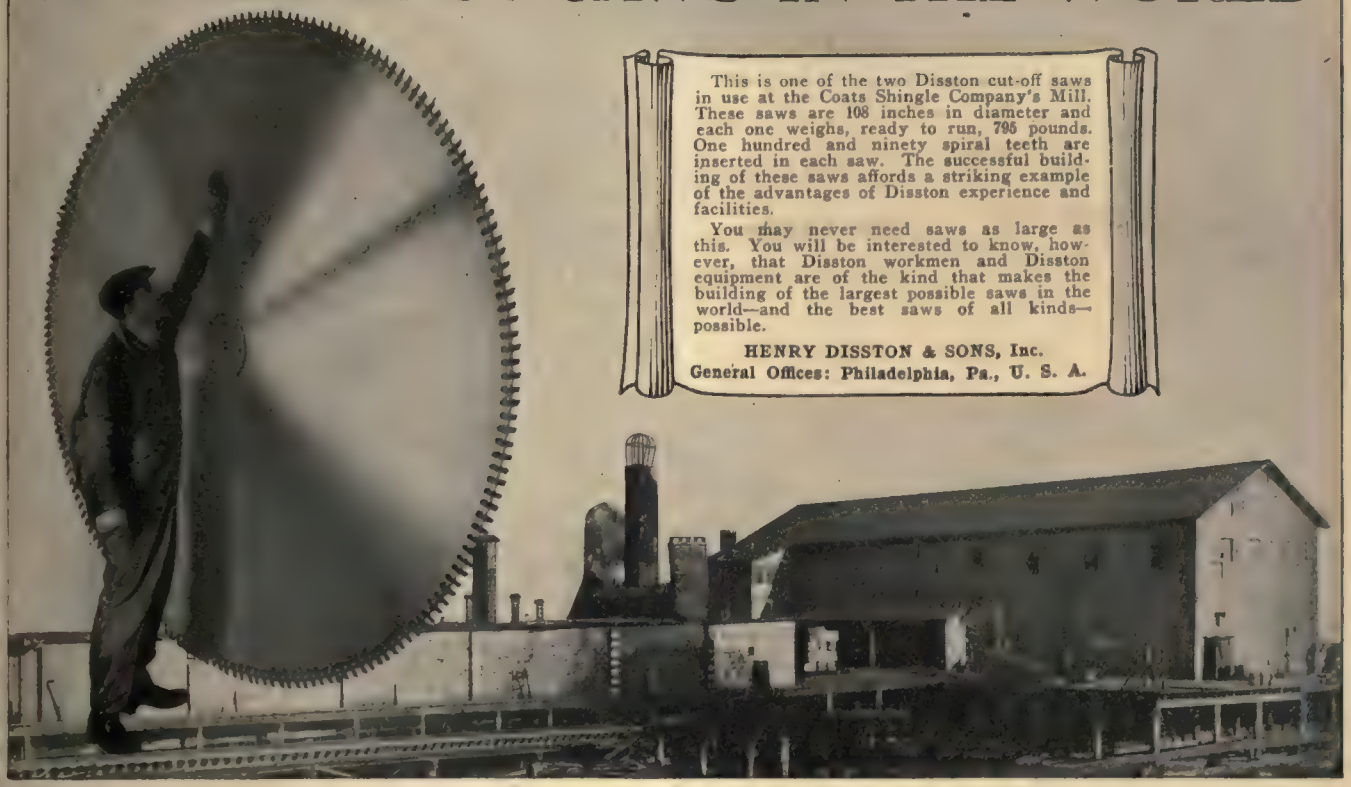
NEW YORK

"NEVER before in America has there been such a popular interest in forestry as is shown in the determination of New York State communities to plant nearly a quarter of a million trees in public forests this spring," said Warren B. Bullock, Director of Forest Extension at The New York State College of Forestry. "This college alone has all it can do with public planting this spring, and in the supervision of several private projects of importance. Here is the list of work already scheduled to be supervised by the foresters from this institution: In Otsego County, the township forest idea will be started with the planting of 50,000 trees, in several localities, with an additional planting of 50,000 by a private owner who wants to do his share toward improving the county. Chenango County is also to have public forests, and plans to plant nearly 50,000 trees this spring. It already has had an acreage given in various parts of the county for five times this number of trees, but the work will be done in annual installments. Herkimer County will plant probably as many trees, in scattered small tracts.

"Malone will plant the first tract in what will be a big city forest, planted as are those of the southern counties, to produce a future cash revenue to the public, and its first year's planting will be 40,000 trees.

"The college itself is completing an arboretum of 20,000 trees within the city of Syracuse, and will supervise the planting of 30,000 trees for a lumberman who wants to try forestry at Lacona.

THE LARGEST SAWS IN THE WORLD



This is one of the two Disston cut-off saws in use at the Coats Shingle Company's Mill. These saws are 108 inches in diameter and each one weighs, ready to run, 795 pounds. One hundred and ninety spiral teeth are inserted in each saw. The successful building of these saws affords a striking example of the advantages of Disston experience and facilities.

You may never need saws as large as this. You will be interested to know, however, that Disston workmen and Disston equipment are of the kind that makes the building of the largest possible saws in the world—and the best saws of all kinds—possible.

HENRY DISSTON & SONS, Inc.
General Offices: Philadelphia, Pa., U. S. A.

SAFETY-FIRST

No great industry like that for the manufacture of Southern Pine can be developed without due regard to the welfare and comfort of the persons employed. Every sort of welfare work calculated to increase efficiency and improved standards of living among the workers is encouraged by the manufacturers of Southern Pine.

Our DEPARTMENT OF SAFETY-FIRST, under the supervision of a capable and experienced engineer, is very actively engaged in work tending to reduce and eliminate injuries to workers in Southern sawmills and woods.

SOUTHERN PINE ASSOCIATION
NEW ORLEANS, LA.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

CINTONELLE, ALA.

By Mrs. Mary Blewett Carothers: W. H. Row, Le Baron Rogers, Howard Johnson.

UNION SPRINGS, ALA.

By Service Star Legion, National Defenders Chapter: Eldridge M. Coke, Jim Faulkner, William Otis Wells.

LODI, CAL.

By Federation of Women's Clubs: Capt. Clyde H. Needham, Capt. Wilbur Hugill, Virgil Pierce, Vernon White, Henry Tremburger, James Miller, Sgt. Ralph Gillespie, Corp. Harold Cary, W. Rossi, Alexander Linde, Herbert Hovard, Charles E. Walther, John G. Anderson, Private Beard, Martin Troy, Roy Seltzer, Henry Wittmeier, Joseph Drabkin, George Mauch, Charles R. Patten, Walter Sievers.

LEWES, DEL.

By Civics Committee, Zuaanendael Club: Capt. Albert Reese Thompson, John Long Morris.

MIDDLETOWN, DEL.

By High School: J. J. Hoffecker, Jr., Rupert M. Burstan, David Manlove. By Negro School: Jeremiah Jackson.

NEWARK, DEL.

By Waverly Club, Women's College: Louis Thorpe, Watson Lenderman, Thomas W. Eaton, Edgar Chalfonte. By Delaware College: William Norman Brennon.

OGLETHORPE, GA.

By U. D. C. Chapter No. 1407: Macon County soldiers who served in World War.

KEWANEE, ILL.

By Woman's Relief Corps: John Duncan.

ROCKFORD, ILL.

By. G. J. Boehland: Earl Hovey, Irvine Rubin, Gunnard Anderson, Herbert Anderson, Elmer Nelson, Leon T. McNish, Evan Rees, Charles W. Arnold, Geo. Abney, Oscar Asprooth, Harry L. Anderson, Victor Baughman, Arvid Johnson, Gust. Johnson, Clayton Ingersoll, Harry Hayes, Henry E. Higgins, Lubbert Hayenga, Leonard C. Hageline, Cornelius Heronimus, Max Gould, A. E. Granberg, Will J. Flowers, John Dohlan, Geo. C. Dohler, Yngve Alf Bengston, Archie A. Bird, Dr. J. A. Brand, Frank Cherichetti, Joseph Ciecierski, Lewis Craig, John P. Dougherty, Walter Craig, Grant O. Damon, Frank Ellis, Alexander Folz, Walter C. Francis, Thomas L. Graham, L. Mardi Whelar, Clyde Spidell, James E. Lynch, Clinton H. Morris, Stephen Mitchell, Thomas Mitchell, Ben. F. Hill, Sgt. Walter T. Graham, Carl H. Swenson, Gilbert D. Gridley, Guiseppe Fontana, Roy Coleman, Lowell Bartlett, James Stanley Brown, Walter Brennan, William Bowers, William Bobian, Elmer Burdick, Jas. Carlton Van Duzer, Hilmer T. Tillstrom, Thos. Timmons, Henry A. Skinner, Williard Stevens, Arthur Sandstrom, Einer Pearson, Fred Peterson, David Nyquist, Bert Nelson, Henry Wm. Nelson, Collins S. Nash, Edgar McMahon, Simon Thomas Murphy, Edward R. Miller, Arthur John Lindstrom, Clarence Lindblade, Alfred B. Larson, John Jansen, Geo. Johnson, Tanner W. Johnson, Harry S. Johnson, Herman Johnson, Arvid Holmberg, Ross Hefferan, Fred Hanson, Harold J. Hanson, Milo L. Haley, William Gorham, Clayton M. Goodman, Eugene F. Egan, Edwin Ralph Estep, Joseph A. Dion, James B. Davidson, Benj. Clayton, Eugene J. Barloga, R. W. Bergquist, Reuben L. Belshaw, James W. White, Louis H. Kreuter, Ralph H. Blackinton, Fred M. Ziegler, Fred E. Woodward, Harry L. Baker, Leslie Boyle, Robt. G. Williamson, Martin A. Lolling, Jas. McCartney, Gust. A. Osberg, Andrew Oscarson, Ole T. Olson, Anton Harry Sjoholm, Tony Sparacino, Carl H. Swenson, Carl A. Larson, Warren Lamont, Alfred Koss, Arnold H. Korte, John L. Jacobs, Clarence E. Jamison, Edward J. Davis, William Dwyer, Jr., Paul Dorsey, Andrew Connell, Giuseppi Ciaccia, Wm. T. Cunningham, Arthur Anderson, Omar Andriasen, William Mandeville, H. W. Kjellgren, C. M. Best, Fred Peterson, Earl Leslie Minard, Harry L. Anderson.

WASHINGTON, IND.

By Washington Rotary Club: Claude F. Palmer.

MARION, IOWA.

By Cary Club: To Marion Soldiers.

ORONO, MAINE.

By Maine Forestry Club, University of Maine: The 38 Maine Students.

SPARKS, MD.

By Halten Garden Club of Baltimore Co.: Sgt. Raymond W. Billingsley.

FRAMINGHAM, MASS.

By Framingham High School: Herbert D. Howe, David R. Buck, Russell J. Mahoney, Leonard Stearns.

GRAND RAPIDS, MICH.

By Mr. Julius Tisch: Rolland W. Tisch, Bertha B. Blasen.

ISHPEMING, MICH.

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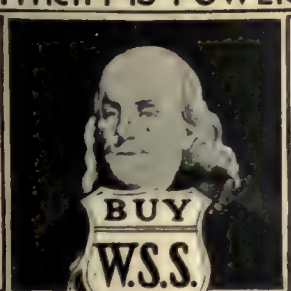
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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

AN Imperial Forestry Conference will be held in London from July 7 to July 22. The opening session will be held at the Guildhall and will be presided over by the Lord Mayor and addressed by Lord Lovat. On the 8th, 9th and 10th tours will be made through the Crown Forests of Dean and Tintern. On July 12 the official sittings of the conference in committee on Forestry Policy will begin and the followig subjects will be discussed: "The Forest Authority," "Responsibility of the State for Forest Policy," "Methods and Problems of Technical Forestry, Education and Research," "Empire Forest Resources and Consumption," and "Scope for Imperial Development." From the 14th to 19th of July, a tour of Scotch forests will be made, visiting Edinburgh, Birnam, Speyside, Beaufort and Novar. On the 20th the Conference will conclude its committee work, and on the 21st will discuss the question of an Imperial Forestry Bureau. On the 23rd Windsor Forest will be visited, and on the 24th to 26th visits to Ireland and the private estate forests will be arranged. This will be a very important conference and foresters and others interested in the subject have been invited from all over the Empire. Forestry matters within the Empire will be discussed along broad lines and the question of providing for the supplies for the future will be carefully gone into.

Among the Canadian Foresters who will attend the conference are Mr. M. A. Grainger, Chief Forester of British Columbia; Mr. Avila Bedard, Assistant Forester of Quebec, and Robson Black, Secretary of the Canadian Forestry Association. Other prominent Canadian foresters have been invited.

The crop of Scotch pine seed in Sweden was practically a failure this last year and no seed is obtainable from that country.

The whole question of source of seed for reforestation is of great importance and this is being shown most strikingly in the plantations of the Laurentide Company. Plants obtained from nurseries using seed from Denmark, probably of German or South Swedish origin are showing bad form, being crooked and ragged in the case of Scotch pine, and the spruce plants, Norway, from seed from the same source, are suffering from frost and sunscald. On the other hand, plants raised from seed obtained from northern Sweden are much hardier and thriftier in every way. Those undertaking commercial planting on a large scale would do well to insist on certificates of origin of seed and plants and insist on getting them from the proper locality. Experiments are being carried out with western white spruce in eastern Canada and so far the results shown are good.

The forestry work of the Abitibi Pulp and Paper Company is proceeding well. A detailed base map of the company's holdings is in progress. An intensive regeneration survey in co-operation with the Commission of Conservation is making good progress. Growth studies for various species and volume tables are well under way. Field investigations to determine the possibility of reducing the logging waste are being made and an exploration of the territory from Cochrane to James Bay has been made. The nursery work has commenced and a nursery is under construction which will ultimately have a capacity of two million trees per annum. The company has decided not to start an aviation department this season.

The Brown Corporation hydroplane was assembled at Sanmaur and made its first trip to the summer base at the Gouin Dam on May 15. It will be used in reconnoissance and photographic mapping work.

The Laurentide aviation work has commenced and daily flights are being made taking photos of construction work on the new water supply system, progress of drives, lands to be bought for reforestation and timber holdings. An up-to-date photographic laboratory has been installed.

Dr. Unwin, of London, a member of the Canadian Society of Forest Eigineers, has proposed the formation of an Imperial Society of Foresters and the matter is under discussion. This recalls the attempt made by the writer in 1911 to form an International Society of Foresters.

An investigation of the conduct of the Department of Lands and Forests of Ontario under the late Government is under way and the returns made by licensees of Crown timber lands are being carefully scrutinized. So far the investigation shows that the supervision of lumbering operations was very lax and that little care was exercised by the Government to collect all that should have been paid in. It is hoped that the new Government will begin a rational and business-like management of its immensely valuable timber resources.

The forest fire situation in New Brunswick has been very difficult this spring owing to the continued dry weather. A large fire has occurred on the lands of the J. B. Snowball Company. Effective effort

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is being made by the Forestry Department to prevent and control the fires.

While the weather has been dry in Quebec no very serious fires have been reported. One of about five square miles, said to have been set by the Canadian Government Railways has been reported. A trip made by the writer over part of this line during the week of May 22 to 27, showed some small fires but not as many as usual.

The Canadian Forestry Association has started a "Planting Car" on a tour of the Prairie Provinces. This car will carry a model nursery and show young plants ready for setting out and the accompanying lecturer will explain the necessity for planting windbreaks on the prairie and give talks on fire protection and general forestry. The Association has also engaged an assistant secretary and has moved into larger offices.

Clyde Leavitt, Dr. C. D. Howe, Professor Millar, Professor McCarthy and Mr. G. A. Mulloy, of the Commission of Conservation, visited the plantations and experimental plots of the Laurentide Company recently. Mr. Ben Avery, Forester for the Spanish River Pulp and Paper Company, and Mr. Simpson, the company's pilot, were also visitors. The Spanish River Company will start a nursery with an output of 500,000 trees for forest planting this coming fall. They have purchased a Dayton-Wright machine and will try out aerial photography for forest mapping.

Messrs. Morency and Relyea, assistant pilot and photographer for Price Brothers Company, visited the Laurentide Company to look into the aerial photographic methods employed by them.

The Canadian Pulp and Paper Association has issued a bulletin, "Government Restrictions upon the Use of Pulpwood Cut from Crown Lands of Quebec, Ontario and New Brunswick." The Canadian pulp and paper manufacturers are almost all taking active steps to conserve and utilize to the best advantage their forest resources and are reforesting on a large scale.

TIT FOR TAT

I often pass a gracious tree
Whose name I can't identify,
But still I bow, in courtesy;
It waves a bough, in kind reply.

I do not know your name, O tree
(Are you a hemlock or a pine?)
But why should that embarrass me?
Quite probably you don't know mine.

(The Bowling Green Column, in The N. Y. Evening Post.)

Plant Memorial Trees

BOUQUETS

"I am very much interested in the propagation of our forests and reforestation of vacant land, and feel that I owe a great deal to your magazine, for it has helped me greatly."

DR. G. S. FOSTER.

"I wish I had subscribed sooner to this publication, as I see I have been missing some great articles. Along with my bird lectures, it seems as though AMERICAN FORESTRY is an absolute necessity, as the two go hand in hand."

H. H. COFFEY.

"The purpose of your organization is indeed a worthy one and should receive the hearty co-operation of every American citizen. We sometimes fail to appreciate the value of these gifts of nature and do not realize until too late what they mean to our national existence."

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Mayor of Berkeley, Calif.

"AMERICAN FORESTRY has contributed much to the preservation of trees and plants in all parts of this country. This magazine is able to gain and retain the interest of its readers, and is to be recommended to all who are and who should be concerned with the preservation of our forests and with the reforesting of our hills and mountains."

M. C. JANES,
Asst. Supt. Berkeley, Calif., Public Schools.

IMPROVE WOODLANDS

LACK of proper thinning and cutting is a common cause of woodlands being unprofitable, according to a recent bulletin entitled, "Making Woodlands Profitable in the Southern States," issued by the United States Department of Agriculture. Nature usually overcrowds trees in a given space, says this publication, and so steps should be taken to give them sufficient light and soil moisture to thrive and become profitable.

By properly controlling the number of trees on a tract it is possible to increase their rate of growth and eventually their size. Except for the production of cordwood, a few large trees on a given area are usually more desirable than many small ones. If possible, valuable kinds of wood should be grown in preference to common woods, which bring lower prices. Woodlands in this country, as a rule, contain many crooked, forked, and diseased trees, which should be replaced by straight, sound ones. Soon after a cutting trees show an increased growth and the whole woodland rapidly increase in value by the elimination of inferior trees.

With an active market for cordwood and for fence posts, poles, and lumber there is every inducement to clear out the inferior trees—diseased, dying, crooked, and less valuable kinds. Right cutting also includes the removal of large, sound trees whose growth is slow, because they are nearing or have reached maturity. The cutting should be done only at a time of favorable market conditions or when building or other timber is needed on the farm. Copies of this bulletin may be had by addressing the United States Department of Agriculture, Washington, D. C.

PAPER PULP FROM SEAWEED

"THAT the manufacure of paper pulp from seaweed is proving a profitable undertaking in Japan seems evidenced by the fact," says the U. S. Consul in that country, as reported by the Bureau of Foreign and Domestic Commerce, "that the only company manufacturing this pulp is building another factory. This concern was organized in December, 1919, and is producing, by a secret process, about 50 tons of pulp daily, which is largely used in the composition of cigarette paper. The new plant, when completed, will have a daily capacity of 150 tons of pulp. The present price is about five cents a pound."

TIMBER sufficient to build 2,750 new five room houses was destroyed by fires on the National Forests in California last season. Fifty-five million feet of California's available timber supply, worth more than $133,000 on the stump, went up in smoke within a few short months.

PATRONIZE
OUR ADVERTISERS

MEMORIAL TREES FOR TRENTON

IN keeping with the movement of the American Forestry Association for the planting of trees in memory of fallen heroes of the Great World War, members of Company C, 104th Engineers, are planning a memorial planting in Stacy Park, Trenton. A tablet is to be erected in the center of six oak trees, to be planted to mark the memory of the six Trenton members of the organization who were killed in action.

Another planting of 180 oak trees along the Lincoln Highway is also arranged for, to perpetuate the memory of the 180 soldiers of Trenton and Mercer County who died in the war.

The suggestion of the Association has met with favor in other parts of the State, and the number of memorial trees will be greatly increased this spring.

A NOVEL IDEA IN TREE SURGERY

SO far as I know, the practice of tree surgery by dynamite is not yet usual, writes M. L. Adams, of Virginia. Hesays: My experience along this line may, therefore, be of interest. When we came to settle on this old farm, we found that the handsomest tree on the place was a great sycamore overhanging the spring. A fine, healthy growth of branches and leaves extended about three-quarters of the way up the trunk, but from that point the top was entirely dead, just bare bole and leafless boughs. We were not tree experts but we saw that top must go. To saw it off at such a height was manifestly impossible; well then, we would blow it off.

A good climber went up until he found the hollow which marked the beginning of the decay. A small charge was placed, the long fuse touched off. With the first "boom," half of the head toppled and fell to the ground. Two other charges completed the work.

"Take No Chances
With Camp Fires
Put Them Out."

TIMBER RESOURCES OF FRANCE

WHEN the lumber industry is organized in France's Colonial possessions, France will have an unlimited supply of timber of all grades available, says the *Fortnightly Survey of French Economic Conditions*, published by the French Commission in New York City. One million cubic meters of timber are cut every year in these colonies, continues this authority, this being equal to 424,000,000 board feet. Going into effect April 1, 1920, an export embargo has been placed in France upon certain wood products, including stavewood, logs one meter 10 centimeters or less in length, and also bush and fire wood, except under special license from the Ministry of Finance.

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R. Y. STUART, forest inspector in charge of the Western Division of Forest Management, U. S. Forest Service, and formerly an assistant district forester in this district, has resigned to accept the position of Deputy State Forester of Pennsylvania, under Gifford Pinchot.

BOOK REVIEWS

"Conservation Reader," by Harold W. Fairbanks. Price $1.20, World Book Company, Yonkers-on-Hudson, New York.

It is necessary that children be trained in right ways of looking at Nature, otherwise the wave of enthusiasm for the conservation of our national resources will expend much of its force uselessly. The present generation not only has the obligations to transmit its inheritance of natural wealth as nearly unimpaired as may be; it must prepare the next generation for an enlightened stewardship. The need for a school text on this subject has been imperative.

That need is adequately met in Harold W. Fairbank's Conservation Reader. This is a real textbook, in which every phase of the subject is treated at such length as its relative value warrants. The author is an authority on conservation, and his book is a unit—not a compilation. The subject itself bears an unusual attraction, touching as it does, almost every natural science except astronomy; and this attraction is enhanced by the author's simple and interesting manner of presentation. The book was written throughout with a view to use in the schools and every page appeals to the pupils' interest. The text is illustrated with a great number of pertinent and most artistic photographs, including color plates of the passenger pigeon and the sage hen and it is especially recommended for use by such organizations as the Campfire Girls, Junior Audubon Societies, Agassiz Associations, Woodcraft Leagues, and Boy Scouts.

The Adventures of Twinkley Eyes, the Little Black Bear, by Allen Chaffee, illustrated with pictures by Peter J. Da Ru. Milton Bradley Press, Springfield, Massachusetts, Price $1.25.

In these very interesting tales, disguised in fiction form, the reader gets a taste of biology, botony, zoology and meteorology, woven into the experiences of Twinkly Eyes, one of the most delightful little characters ever created in animal literature. His adventures with his brother Woof, and their mother, Black Bear, teach him the vital lessons of life through experience, and their moral emphasis is clearly conveyed to the minds of young readers. The habits of the bear and other animals introduced in this book are faithfully portrayed, and the refreshing environment of green forests and open fields is sensed in every chapter. The book, while primarily written for children, whose taste it was the hope of the author to guide toward a love of nature and the things of out-of-doors, will be read with thorough enjoyment by grown-ups as well, and Twinkley Eyes has been made to vividly live in the pictures drawn of him and his friends by Peter J. Da Ru.

Trail and Tree Top, by Allen Chaffee, illustrated with drawings by Peter J. Da Ru. Milton Bradley Company, Springfield, Massachusetts, Price $1.25.

In the introduction to this charming book, just from the press, we find that it holds, in true-to-nature form, some of the comic, daring or pathetic exploits of Mammy Cottontail, Jimmy Crow and brave grumpy old Fatty Chuck, for whom Frisky Fox and the others kept things so lively. And here too, is the Boy from the Valley Farm, who knew just what to do in some of the emergencies that befell his furred and feathered friends. Trail and Tree Top will be welcomed by all little folk who love the woods-people, for while there are a few big words for the while there are a few big words for the grown-ups, these are all explained for the younger readers.

"Going Afoot," by Bayard H. Christy, from the Association Press, of New York, will be welcomed by the clan of the strenuous and the lovers of life out of doors. They will gain from this little book a new appreciation of the joys of the road and will find it full of practical and helpful suggestions on when, how and where to walk. Trampers will read with much interest the accounts of famous walking clubs in America and directions for the organization and conduct of such clubs.

LARGEST SAWS IN THE WORLD

WHEN it was suggested that Henry Disston and Sons make some circular saws 108 inches in diameter to be used in cutting shingle bolts, most people laughed and thought the idea crazy. The strain would be too great, no mandrel could hold, a saw with a surface so large could not run straight and true. But even as Marconi accomplished his idea of the wireless telegraph after all the world mocked, so has the Disston firm done what seemed impossible. On April 10, 1920, two circular saws, 108 inches in diameter, made in the Disston plant in Philadelphia, began their first run in the Coats Shingle Mill at Hoquiam, Washington, and they ran perfectly. Special machinery was necessary to carry them. The power turned on, they began to run slowly, then as the speed grew the hum increased until it sounded like the noise of a swarm of bees. The serrated edge, traveling at a speed of 130 miles an hour, cut through big Coast logs with an ease and rapidity that astonished experienced mill men. With an ordinary saw the shingle weavers frequently had to wait for bolts to accumulate, with the installation of these saws the crews in the cutting and packing departments were fairly swamped.

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In The Mountains."



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FORESTS AND IRRIGATION

AN excellent illustration of the relationship that exists between forested areas and the irrigation problem is the following:

Tip a table to the angle of 45 degrees and cover its surface with sponges to correspond with the layer of decomposed vegetable matter in a forest. Pour water over the table and a large proportion will be retained in the sponges to ooze out gradually. Remove the sponges and repeat the process of pouring water over the table. Of course the water will immediately seek the lowest level. Forests on mountain slopes have the same effect in retaining water that the sponges had. Water from winter storms held back by the forest's decomposed vegetable matter, enters the ground, and oozes out gradually later in the year.

From the foregoing, the necessity of protecting our forested areas from fire and the necessity of having mountain slopes, not valuable for agriculture, covered with forest trees is readily understood.

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are listed in our Catalog of 99% guaranteed Mailing Lists. It also contains vital suggestions how to advertise and sell profitably by mail. Counts and prices given on 9000 different national Lists, covering all classes; for instance, Farmers, Noodle Mfrs., Hardware Dlrs., Zinc Mines, etc. *This valuable reference book free.* Write for it.

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FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had four years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C.

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C.

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 38 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 810, care American Forestry, Washington, D. C.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

DISCHARGED SAILOR would like position as assistant forester or a permanent position as surveyor with some lumber company with a chance for advancement. Salary is of secondary consideration. Married, so would have to locate in some small town. Have had four years' practical experience in general forestry, and some tree surgery. Address Box 900, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C.

POSITIONS OPEN

MAN WANTED with technical training and practical experience sufficient to make him thoroughly competent as a developer of Park plans, and also Park Superintendent—both in road construction, planting and landscape work—and Director of Forestry Service upon the public streets and parks of the city. Address Box 910, American Forestry Magazine, Washington, D. C. (6-9-20)

WANTED—Man capable of Supervising Slack and Tight Barrel Plant; Purchase and Inspect Cooperage Stocks; Develop Boxes, Crates and other Packages for miscellaneous articles. State experience, salary wanted and references in first letter. Address Box 123, care of AMERICAN FORESTRY MAGAZINE. Washington, D. C

CAMPING GROUNDS IN NATIONAL FORESTS

PROBABLY no one piece of woods work has done so much to acquaint the public with forest fire protection and secure its support as the improvement of camping places in the National Forests, says "The Forest Patrolman," published by the Western Forestry and Conservation Association, in its last issue. The public is appreciative of rude conveniences for its comfort and everyone is thereafter more careful with fire in the woods. The National Forests are public property and as such are to be administered so as to secure the greatest public enjoyment of their resources, including fishing, hunting and camping. Improvements in the way of clearing, and rough fire places and garbage pits have been made on over 344 camp grounds in Oregon and Washington in the National Forests, these improved camp grounds being visited annually by nearly 350,000 people. A surprising amount of public appreciation has been expressed for the camp ground work, say many forest officers, and the result has been a greatly increased public understanding of the objects of the National Forests, an increased co-operation and a better support in fire protection work.

TIMBER RESOURCES OF ALASKA

THE timber in Alaska is much more suitable for pulp and paper than it is for saw timber, says the British Consul at Seattle in a recent report. "Consequently," he adds, "on account of the unlimited amount of cheap wood and immense quantities of cheaply installed water power with deep water transportation to the doors of the world, southeastern Alaska in the comparatively near future must become one of the great paper centers of the world." The best timber in the coastal region or wet belt is found in the Tongass National Forest which comprises nearly all of southeastern Alaska. It is estimated that this region contains 70,000,000,000 board feet of merchantable timber, of which hemlock makes up 65 per cent; Sitka spruce, 20 per cent, red cedar, 7 per cent, yellow cypress, 5 per cent, and other species, 3 per cent.

During 1918, nearly 18,000,000 board feet of hemlock piling was cut on the Tongass National Forest, this being used chiefly for fish traps and wharves. From 30,000,000 to 40,000,000 feet of Sitka spruce is cut annually on the Tongass and Chugach National Forests.

During the war, Alaska furnished large quantities of the very best airplane lumber that was secured, this being practically the only lumber that Alaska has ever exported.

GETTING THE MOST OUT OF THE WOODS

THE emphasizing of the wasteful lumbering methods of the past is of little service unless the practicability of better measures can be shown. Where economical logging methods are being used they should be given full recognition by all conservationists, and given earnest consideration by operators. An instance of close utilization is evidenced on the limits of a company operating in a modest way in the Parry Sound district. This company secured a block of timber, consisting of mixed hardwoods and conifers, situated near the mill of another company. The first mentioned company let out its woods operations to a sub-contractor and is proceeding to log the area very cleanly. The thoroughness of the operation is shown in the disposal of the products. The soft wood logs go to the neighboring mill; the hemlock ties (hewn) to the railway company; the spruce and balsam pulpwood to a pulpmill at a considerable distance; the basswood logs, as also any good balm-of-gilead logs, go to New Jersey for match stock; the birch logs go to Montreal for export to Europe, for use as veneer, and the other hardwoods, including white oak, ash and elm, are also disposed of. In addition, cedar poles are taken out, the hemlock bark is shipped to tanneries near Toronto, and hardwood waste is used as fuel in its camps. This operation, therefore, may be said to represent the maximum of close utilization. This timber license, of course, is close to a railway, but there must be many opportunities for other such intensive operations throughout Ontario.

Close utilization is also adopted by some of the chemical companies. They operate sawmills in conjunction with their wood distillation plants, and have logging railways, one of which is 13 miles long. They saw both softwoods and hardwoods into lumber, carbonize smaller hardwoods for chemicals, and use inferior cordwood and slabs from the mill for fuel to heat their ovens. One company at least is about to experiment with the carbonizing of hardwood slabs.

These examples include the logging of hardwoods, which is necessary to solve present forestry problems. It seems probable that more companies could be operating logging railways and removing hardwoods when the present prices of finished products are considered. If logging railways are not feasible further experiments with driving hardwood logs might be carried out. Many companies have already successfully driven hardwoods for short distances, after leaving the logs in the bush for a year to dry out.—(*A. V. Gilbert, in Conservation.*)

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From letter of Mr. Walter Meigs, President and General Manager, we summarize the following:

(1) The Canadian Pulpwood Corporation holds 102½ square miles (approximately 65,600 acres) of well located, heavily timbered crown limits, and 17,000 acres of freehold timber and timber rights, in Bonaventure County, Province of Quebec, on the Bay of Chaleur.

(2) The Company has developed a highly efficient organization for the production, transportation, sale and distribution of its products, which are basically essential commodities in constant demand.

(3) Conservative appraisals show net assets securing this issue of $800,133.07 or MORE THAN THREE TIMES THE AMOUNT OF BONDS OUTSTANDING; while the operation of the Sinking Fund will retire this entire issue before one-fifth of the timber has been cut.

(4) Net earnings have steadily increased from year to year, amounting for the season 1919-1920 to $150,000, and are estimated at over $200,000 annually, or TEN TIMES THE MAXIMUM INTEREST CHARGE ON THE BONDS ISSUED.

Subject to prior sale and allottment we offer these bonds, as, if and when delivered to us.

PRICE 100 AND ACCRUED INTEREST WITH 20% IN COMMON STOCK

The above is summarized from a circular which will be sent upon request. In underwriting this issue we have thoroughly convinced ourselves of its unusual merit as to safety and returns.

JAMES D. LACEY AND COMPANY
Seven East Forty-Second Street

PAPER PULP FROM PAPYRUS GRASS

ARRANGEMENTS for the manufacture of paper pulp from papyrus grass in Zululand are now in progress, says Vice Consul Charles J. Pisar, of Cape Town. A Norwegian company (Walmer Papyrus Pulp Company) has secured a concession over several hundred square miles from which to reap all reeds and papyrus grass, which are considered to be excellent raw materials for the manufacture of paper pulp. The company is capitalized at £160,000 ($779,000). A factory capable of turning out 6,000 tons of pulp a year is now being erected at Umfolosi. Most of the machinery and equipment was obtained in the United States.

The company intends at first only to manufacture paper pulp. It is estimated that it will take fully 40,000 tons of raw material to produce the 6,000 tons of pulp, but as the growth of this grass is perennial, and the area where it is found is so extensive, an abundance of raw material is assured each year. The papyrus has to cut by hand in the same way as sugar cane. The grass is dried, passed through a cutting machine, and then pressed and limewashed. An abundance of cheap colored labor is available. Later on the company intends to extend its operations to the manufacture of paper, textiles, and bags.

TIMBER HELPS POOR LANDS

TIMBER is essentially a poor-land crop. Steep slopes, poor soil, rocky land, unusual corners, gullied and wooded tracts—all these afford opportunities for growing timber profitably. A careful survey of the average farm will reveal a surprising number of spots of this sort which can be utilized to advantage. If they do not already have trees, planting them with the proper varieties will materially increase the value of the land.

Certain kinds of trees, like the locust and the acacias, build up poor soil through the nitrogen-gathering bacteria in the root nodules, according to the Forest Service, United States Department of Agriculture. The soil building power of trees on slopes is a fact which the farmer should not overlook. Steep lands, which have been cleared of timber at much expense, after being cultivated for a few years often became gullied, and the rich lands adjoining are covered with deep deposits of sand. The surest and cheapest method of protecting such slopes is to maintain forests on them.

Small gullies can be stopped up by closely packed brush and tree tops, anchored by stakes if necessary. Large, open gullies are checked successfully only by planting over the entire gully basin, supplemented by low brush dams across the larger units of the gully.

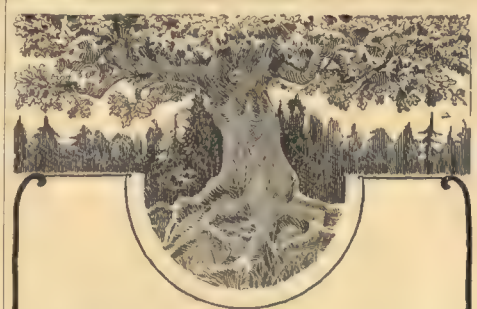


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Correspondence Course in Lumber and Its Uses. No tuition, and otherwise expenses are the lowest.

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in the Heart of the Rockies

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FOREST SERVICE BOOSTS ALASKA

THE Forest Service is definitely committed to the policy of doing its utmost for the fullest development of the timber resources of Alaska. This statement, made by District Forester Cecil, upon his return from an important conference in Seattle, is fully borne out by the recent decision to make more flexible the present timber sale contract requirements of the Forest Service to better fit the unusual Alaskan conditions.

Mr. Cecil brought out the fact that although the Forest Service during the past ten years has sold some 400 million feet of timber from the Alaskan National Forests and that the Service has consistently encouraged the sale of Alaskan pulp woods, that due to the present seriousness of the newsprint situation, a more flexible policy is now justified for the Territory. The new policy provides for granting contracts for sufficient timber for a 30-year cut, and makes provision that where additional timber is available, a 15-year additional supply will be reserved for existing pulp plants.

The new contracts, the District Forester emphasized, are to provide for a readjustment of prices at intervals of five years after cutting begins, the first readjustment to be made seven years after signing the contract, if the full two-year period allowed for plant construction has been used. In addition, a maximum price is fixed which in no case will be exceeded in the readjustment covering the second five-year period. A third point of the new policy is that the readjusted pulpwood rates are to be based on current pulpwood values in southeastern Alaska.

The whole aim of the new policy, the District Forester stressed, is to make clear that the Forest Service is willing to make every effort consistent with existing federal laws to bring about the fullest development and use of the pulp timbers of the Alaskan National Forests.

IMPORTANCE OF FARM WOODLOTS

ABOUT half the fuel used on farms in general is furnished directly by the farm in the form of wood. The average farm family uses annually between 9 and 10 cords of wood for fuel, in addition to which about 3 tons of coal is bought. The wood, furnished almost altogether by the farm, represents a very considerable item. The farm woodlot should not be overlooked by the farmer in planning for the economical utilization of the resources of his farm, says the United States Department of Agriculture.

"Before
You Leave
A Camp Fire
Be Sure It's Out."

NATIONAL FOREST FEES

THE nineteen National Forests of Idaho earned $463,070 in fees during the fiscal year ending June 30, 1919, of which 25 per cent has been remitted to the state for distribution to roads and schools in counties in which the forests lie. In the California district, including that state and a small part of Nevada, the Forest Service receipts for the quarter ended September 30, have been $147,995 and in the district embracing Oregon, Washington and Alaska, $115,134 was collected during the same period. Receipts for the entire Forest Service for the quarter named were more than half a million dollars. These receipts are fees from rental permits for grazing, water power privileges, sites for hotels and similar buildings, etc.

"Forest Fire Season
Take No Chances
With Fire."

WEALTH OF TRANSCAUCASIAN FORESTS

THE forest vegetation of Transcauscasia, which covers seventeen per cent of the total area, is such as to place it among the richest of forest countries, says the Trade Commissioner at Constantinople, in a recent report of the Bureau of Foreign and Domestic Commerce. The value and extraordinary variety of species (366 different species) which are to be found in these forests as well as their commercial importance invite closest attention as it is obvious that the forests will in the near future be eagerly sought in foreign markets. Negotiations have already been opened by representatives from Poland and Italy and by groups of native capitalists with a view to obtaining concessions to exploit these forests. These contractors who have made a careful study of the local timber wealth believe that Transcaucasia will play an important part in supplying European markets with lumber for construction and that such developments will be active after the delays and damage caused by the war. Firewood, lumber and timber were already, before the war, among the most important articles of merchandise carried by the railways of Transcaucasia.

The species of woods most commonly found and of the greatest value are the resinous trees, pine, fir and spruce, the last represented in the Caucausus by a species called oriental spruce, remarkable for the fineness of its grain and furnishing, in addition to saw wood for building, wood highly priced in the manufacture of musical instruments. The forests furnish also many by-products of great commercial value such as tannin and gallic acid, trees and bushes which produce excellent organic materials for dyeing, vegetable oils, and plants with curative and valuable chemical properties.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

AUGUST, 1920 CONTENTS VOL. 26, NO. 320



NOOSACK FALLS, NEAR MT. BAKER, IN WASHINGTON

Fire has been through the woods just above the falls causing a great deal of damage.

CHANGE OF ADDRESS

A request for change of address must reach us at least thirty days before the date of the issue with which it is to take effect. Be sure to give the old address as well as the new one.

Members desiring to discontinue membership and magazine should file formal letter of resignation at least thirty days prior to expiration of membership.

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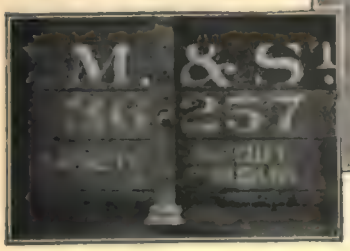
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A Carbosoted Gondola.



After coat of Carbosota dried, stencilling was shellaced and immediately painted over with ordinary white lead and oil.



Illustration shows perfect legibility of stencilling after 17 months.

Saving

approximately 50% on painting Gondolas

IN 1917 it cost $5.00 less to paint a gondola car with Carbosota than with the standard red-oxide paint. The saving is even greater today.

The illustrations show one of these Carbosota-stained cars after seventeen months' regular running.

The white lettering was stencilled in the usual way, over a preliminary coating of shellac. As you can plainly see, it is still perfectly legible, although the car had recently been loaded with lime which had to be washed off before photographing.

There is no real reason, save custom or cheapness, why cars should be painted **red.** The protective and preservative value of Carbosota is far superior to that of paint. Its dark brown color is equally serviceable and attractive, and its cost is far less per car.

If you are interested in experimenting with Carbosota as a money and lumber saver, in place of paint, we will gladly co-operate with you.



Carbosota Creosote Oil is the universal wood preservative for non-pressure treatments. It is a standardized, pure coal-tar creosote oil, highly refined and specially processed, to make it physically fit for this purpose.

(*Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exceptions should be made in such cases and treatment modified accordingly.*)

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AMERICAN FORESTRY

VOL. XXVI AUGUST, 1920 NO. 320

EDITORIAL

FALSE ECONOMY

AMONG the "economies effected during the last session of Congress was a cut of nearly $29,000 in the regular appropriation for forest investigations in the Forest Service. It is unfortunate that Congress, in its need of retrenchment, found it necessary to cut most heavily in the appropriations for scientific work. Any one who is familiar with the splendid work done at the forest experiment stations and the great hardships and handicaps under which the enthusiastic scientific staff has been working for years in the hope of more liberal appropriations to enlarge the scope of the work and provide better facilities for it, will appreciate the serious blow which such a cut means to scientific work in forestry in this country.

The usual appropriation of $78,728 was never adequate to maintain the eight forest experiment stations in the West, and the investigative work in the East. Several years ago it was necessary as a result of lack of funds, to shut down the experiment stations in California in order to provide sufficient money to carry the rest of the experiment stations. With an appropriation of only $50,000 for the coming fiscal year, it will be necessary to stop practically all the field work at the experiment stations and retain merely a skeleton organization consisting of a single man. The plan recently adopted for providing in each western district a technical man to act as the connecting link between the administrative force on the forests and the scientific work in the district, and to see that the results of the experiment stations are applied to every-day practice in National Forest administration, must now be abandoned. Of course, no new projects of any kind, no matter how urgent, can be undertaken and even current records on some important investigations already under way may have to be either discontinued entirely or greatly curtailed.

The cut in the appropriation for forest research will fall especially heavily on the work in the East. With the urgent demands for exact information in the management of the Western National Forests, forest research was, until recently, largely confined to western problems with only an accidental investigation of some eastern problem. It was definitely planned that in any enlargement of the scope of forest research the East should receive greater attention. A number of forest experiment stations in the New England States, the southern hardwoods, the southern pineries, and the Lake States, similar in scope to our western forest experiment stations, had been planned. Under present conditions, of course, nothing can be done in the way of establishing experiment stations in the Lake States, the Northeast or the South, yet the problems there, in the face of the rapidly waning supply of hardwoods and southern pine, are particularly urgent.

It is especially unfortunate that the decrease in the appropriation for forest studies should have come at a time when many organizations, Government, State and industrial, are awakened to the need of a better handling of the remaining forests and are depending on accurate knowledge for applying the different measures suggested for providing a permanent supply of raw materials for the people and industries of the country. The failure to secure this year adequate funds for forest research should not, however, discourage the efforts of those who tried to bring about a better recognition of the need of such investigations; every one who has the progress of scientific forestry at heart should double his efforts, and with renewed energy and hope, work for a better financial support by Congress of forest studies.

TREE PLANTING AND PUBLICITY

TO carry along the American Forestry Association's campaign of education regarding forests and trees the University of Illinois directed students in its School of Journalism to write editorials on the memorial tree planting at the University, for the newspapers of the State. The result was state-wide publicity and a valuable addition to the campaign which is teaching the people throughout the country the value of trees and the need of perpetuating our forests.

As a sample of the editorials the following is reprinted:

"There is no one thing in the world that adds more to man's comfort than the silent tree that stands above him. During the hot summer months he revels in its

shade and in winter he is warmed by the fire which consumes it. We think of the desert and the plain as dreary and uninhabitable because of the lack of plant life, particularly the lack of trees. Although we may have come to take the trees for granted, we miss them sorely as soon as we are away from them.

"There is something wonderfully impressive about a great tree. It is silent; but as it sways with the wind and its leaves shine forth a cheery welcome to the sun, it is wonderfully expressive. Its dignity is supreme and its silent evidence of power is kindly. It is extended to the animals and plants which live beneath it or hide in its branches. It is a protector of the weaker elements of nature which depend so much upon it for their existence.

"Could anything be a more fitting memorial? Does not the tree in its very life express the ideals that the men who died to protect their fellow men have actively carried out? Nature is the only avenue through which we can adequately express our thanks to those who have gone beyond where our word can be heard. It is a co-operation with a Higher Power to erect a permanent memorial, symbolic of the lives of those to whom we wish to do honor.

"The University of Illinois has set a worthy precedent by planting trees as permanent memorials for its one hundred and seventy-three Gold Star men."

VALUE OF FOREST PRODUCTS INVESTIGATIONS RECOGNIZED

ONE feature of the Forest Service appropriation bill for the fiscal year 1921, which can be unreservedly commended is the increase in the item for forest products investigations from $173,260 to $223,260. Forest products investigations constitute one of the most important, best known, and most popular of the lines of work conducted by the Forest Service. The practical value of these investigations was so thoroughly demonstrated both during and since the war that they have the practically unanimous approval of foresters, lumbermen, and individuals in the wood-using industries throughout the country.

In his estimates to Congress for the fiscal year 1921, the Secretary of Agriculture requested an appropriation of $348,260 for investigations in forest products. In presenting this estimate the Secretary stated:

"There is in the aggregate an enormous unnecessary waste and lost of efficiency throughout nearly every phase of wood manufacture and utilization. Every dollar of this loss is an added cost in production, and every foot of wood waste an additional drain on our forest resources. It is beyond a doubt that economies running into many millions of dollars a year are easily realizable through application of the results already obtained by forest products research."

At the hearings held by the House Committee on Agriculture in December, 1919, a representative of the National Lumber Manufacturer's Association inserted in the record the names of some 230 trade organizations in the wood-using industries which approved the work of the Laboratory and which believed it should be given an appropriation of at least $500,000. This sum is a very conservative estimate of the amount needed to finance adequately the investigations in forest products now conducted by the Forest Service and centered chiefly at the Madison Laboratory. In every phase of forest utilization, from the kiln drying of lumber to the manufacture of plywood and the development of laminated construction, additional investigations are need deto bring about the most effective and economical use of wood in all its forms. The perpetuation and improvement of our forests is fundamental in the development of any nation-wide forest policy, but almost equally important is the conservative use of forest products of all kinds in the industries. It is hoped that next year the precedent set by the present Congress will be followed and still larger appropriations made for this branch of the work.

MAINTAIN THE INTEGRITY OF THE FOREST SERVICE

THE final report of the Congressional Joint Commission on Reclassification of Salaries emphasizes the plea which American Forestry has repeatedly made for increased salaries for foresters in the Federal Service. That the present situation is critical and threatens the integrity of the entire Government Service is frankly recognized by the Commission.

The steady increase in the resignations of scientific and technical employees is shown by the fact that while in 1916 the technical and clerical employees were leaving the service at the same rate, which amounted to an annual turnover of 12 per cent of the total number on the rolls, in 1919, the rate of turnover among the technical employees had jumped to 69 per cent, as against 29 per cent for the clerical employees. Those leaving the Service have naturally done so at an increase in compensation which is very striking. Thus, in the case of 1,173 scientific and professional employees who resigned during recent years, the average advance in salary on accepting outside employment was $995, or 53 per cent, while in the Forest Service, it was 55 per cent. During the present calendar year, 30 per cent of the entire field force of engineers in the Forest Service has resigned, one man leaving a position paying approximately $1,600 a year to accept a job as stevedore at $12 a day!

The seriousness of such a situation can hardly be over-emphasized. It is perhaps even more critical in the case of the Forest Service than in any other scientific bureau because of the unique position of the profession of forestry. It is estimated that out of the approximately 4,000 men engaged in forestry about 3,000, or nearly three-fourths, are in Government and State services.

Because of the fact that the actual practice of forestry in this country is almost entirely confined to forests under public ownership, forestry is at present largely a National and State profession. Anything which tends to cripple the National Forest Service, as the payment of the present inadequate salaries undoubtedly does, is therefore a matter of vital concern to the entire Nation. This point was well brought out in the brief presented by the former Forester, Col. Henry S. Graves, to the Reclassification Commission, in connection with the schedule of salaries suggested by himself and other administrative officers and employees for foresters in Government service. In Col. Graves' words:

"Practically every forester who leaves the service of the public represents not merely a loss of accumulated experience and training, but also a social loss, since his new activities cease to be a benefit to the public interest. Probably there is hardly another industry in this country at this time where such a divergence exists as between work on public forests and that on privately-owned timberlands. In readjusting the salaries paid foresters in the Government service, this aspect of the situation must be considered. The future of our timber supply, as now handled, and of the multitude of industries dependent on it, presents a grave national problem. If our trained foresters, whose chief function should be to develop methods and bring about a continuous timber production on cutover lands, are allowed to drift into the employ of private interests, whose chief concern is the cheapest and most effective exploitation of standing timber without regard to forest replacement, they will aggravate instead of remedying this situation."

The salaries proposed by the Reclassification Commission range from $840 to $1,800 in the case of the sub-professional classes and from $1,800 up in the case of the professional classes. These figures are considerably less than those recommended by Col. Graves, and fall far short of meeting the increase in the cost of living during the past few years. They are, however, so much more satisfactory than those now in effect, that their immediate enactment into law would be of real benefit both to the individual employees and to the Service. While they could hardly be expected to reduce personnel turnover to a negligible quantity, they would undoubtedly relieve the present situation and make possible the maintenance of a fairly stable force of experienced men. Amendments should, however, be made in the proposed salaries for the two sub-professional grades, Junior Aid (corresponding to the present Forest Guard) and Senior Forest Aid (corresponding to the present Forest Ranger). The recommended salaries of $840 to $1,200 a year for the former and $1,200 to $1,800 for the latter are less than it is now necessary in many cases to pay for qualified men, and should be increased to perhaps $1,200 to $1,680 and $1,560 to $2,160, respectively.

Everyone who is interested in seeing the integrity of the Forest Service maintained, and in effect this means the integrity of the entire profession, should do everything in his power to bring about prompt action by Congress on the recommendations of the Reclassification Commission. It is absolutely essential that relief from the present pressure of inadequate salaries be secured, and the Commision's report offers a concrete means of securing such a relief. Since the present report applies only to the Washington force, it is equally essential that steps should be taken to secure a similar readjustment of compensation for the field force in the immediate future.

LUMBERMEN ENDORSE REFORESTATION

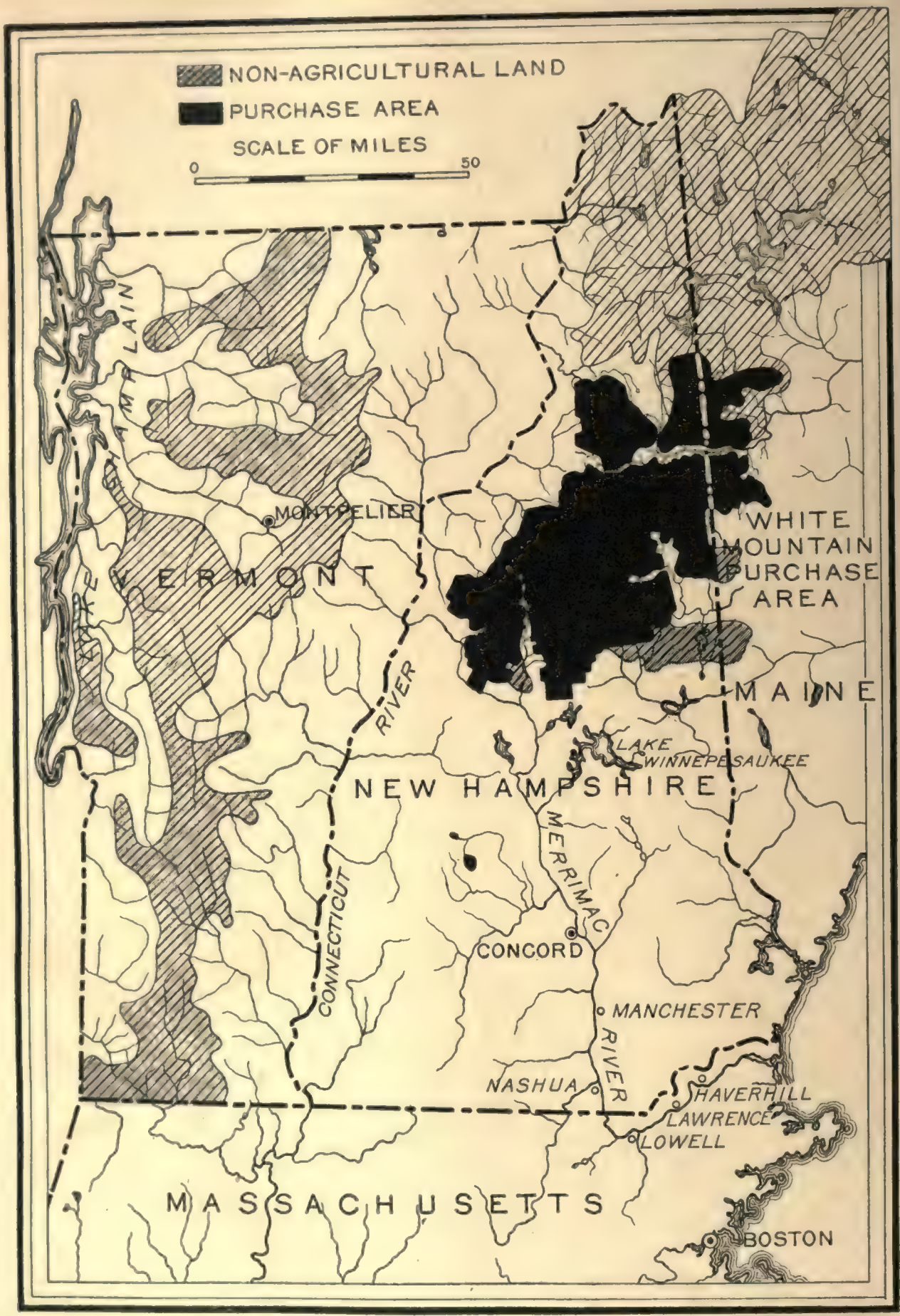
A CLEAN cut endorsement of the principle that seed trees should be left on every acre of forested land which at the time of cutting is not considered cultivable was the remarkable stand taken by progressive Louisiana lumbermen at a meeting of a special legislative committee of the Louisiana Forestry Association which met at New Orleans on May 13. This committee was composed of President Hardtner, of the Louisiana Forestry Association; M. L. Alexander, Commissioner of Conservation of Louisiana, and the following lumbermen or their accredited representatives: E. A. Frost, Frost-Johnson Lumber Company, of Shreveport; W. H. Managan, Krause & Managan Lumber Company, of Westlake; S. T. Woodring, Calcasieu Longleaf Lumber Company, of Lake Charles; W. H. Sullivan, Great Southern Lumber Company, of Bogalusa, and C. E. Slagle, Louisiana Central Lumber Company of Clarks.

This committee unanimously approved the following law for incorporation in the present forestry statutes of Louisiana:

* * * Be it further enacted, etc., that the owner or owners of forested lands which shall be cut over or denuded subsequent to the passage of this Act, or those who cut over or denude forest lands belonging to another, shall be required to leave standing on each section or fractional part thereof an average of one seed tree per acre to promote the natural reforestation of the same, provided

That the provisions of this Act shall not apply to lands which the owner shall declare to be susceptible of cultivation and intended for sale or development as such; declaration of the cultivable character of forest lands shall be made at annual intervals, in writing and in advance of cutting or denuding, to the Commissioner of Conservation.

So far as is known this is the first time that a representative group of lumbermen have publicly enunciated the principle that non-agricultural timbered lands should be left after lumbering in a condition to reforest naturally. It is a recognition of the principle that lands which are not suitable for other purposes should not be allowed to become a public nuisance and a burden upon the community as a result of absolute clean cutting.



WHITE MOUNTAIN REGION AND GREEN MOUNTAIN REGION

The black area indicates land purchased and now included in National Forests, and the darkened area is non-agricultural land suitable for growth of forests.

PROGRESS OF THE PURCHASE OF EASTERN NATIONAL FORESTS

FROM REPORT PREPARED BY

NATIONAL FOREST RESERVATION COMMISSION

THE Eastern States are confronted with a serious shortage of lumber for building purposes,* and of wood for making paper.† As a result of injudicious methods of cutting and the ravages of fire, privately owned forest lands, after having been lumbered, have declined in productivity, and some tracts have ceased altogether to yield returns. The supply of eastern spruce available for paper stock is nearly exhausted, eastern building material is no longer adequate fully to meet industrial demands, and the future supply of hardwoods is threatened and will not be sufficient unless prompt measures are taken for maintaining the productivity of the hardwood forests.

The act of March 1, 1911 (the Weeks law), which was designed primarily for affording protection to the headwaters of navigable streams, seeks its results through the maintenance of forests. It thus offers a means of furthering measures for maintaining a supply of eastern timber. Under its provisions 1,841,934 acres of spruce and hardwood forest in the Eastern States have been or are now in process of being acquired out of a total of more than 50,000,000 acres of this class of timberland upon which eastern industries have been dependent for supply.

This act established the National Forest Reservation Commission, consisting of the Secretary of War, the Secretary of the Interior, the Secretary of Agriculture, two Members of the Senate, and two Members of the House of Representatives. The commission authorizes the purchase of all lands being acquired under the act. Purchases are restricted to such lands as are so located, as determined by the Geological Survey, as to be influential in promoting the navigability of navigable streams by protecting their headwaters. This restriction has practically required that purchases be limited to rough lands located in the mountainous sections of the country.



HARDWOOD STAND

Yellow poplar, chestnut and oak, on purchased land—characteristic of virgin and culled forests being acquired in the Southern Appalachians.

The original Weeks bill carried an appropriation of $11,000,000, covering several years, of which $3,000,000 was for the fiscal years 1910 and 1911, but it was possible to expend economically only $17,000 of this appropriation for these years, leaving slightly more than $8,000,000 available. To this, by the agricultural appropriation bill of 1916, was added $3,000,00, being a reappropriation of the moneys that had lapsed; and, by the agricultural appropriation bill for the fiscal year 1920, there was a further appropriation of $600,000. The commission has authorized the expenditure of approximately all but $300,000 of these appropriations.

The National Forest Reservation Commis-

*Report, Secretary Southern Pine Association, January, 1919.
†Committee American Paper and Pulp Association, November, 1919.

sion has now gone on record in favor of a further appropriation for purchases to be used both in the solidification of established areas and in the location of new areas. As a result of this action of the commission, the Secretary of the Treasury has transmitted to the Speaker of the House (H. Doc. 321, 66th Cong., 2d sess.) a letter from Hon. Newton D. Baker, president of the commission, submitting an estimate for an appropriation needed for the acquisition of additional lands at the headwaters of navigable streams under the provisions of the act of March 1, 1911 (36 Stat., 961), known as the Weeks law. This communication has been referred to the Committee on Agriculture. The needed appropriation covers a period of five years, beginning with the fiscal year 1921, at a rate of $2,000,000 per year. Bills have already been introduced in both the Senate and the House of

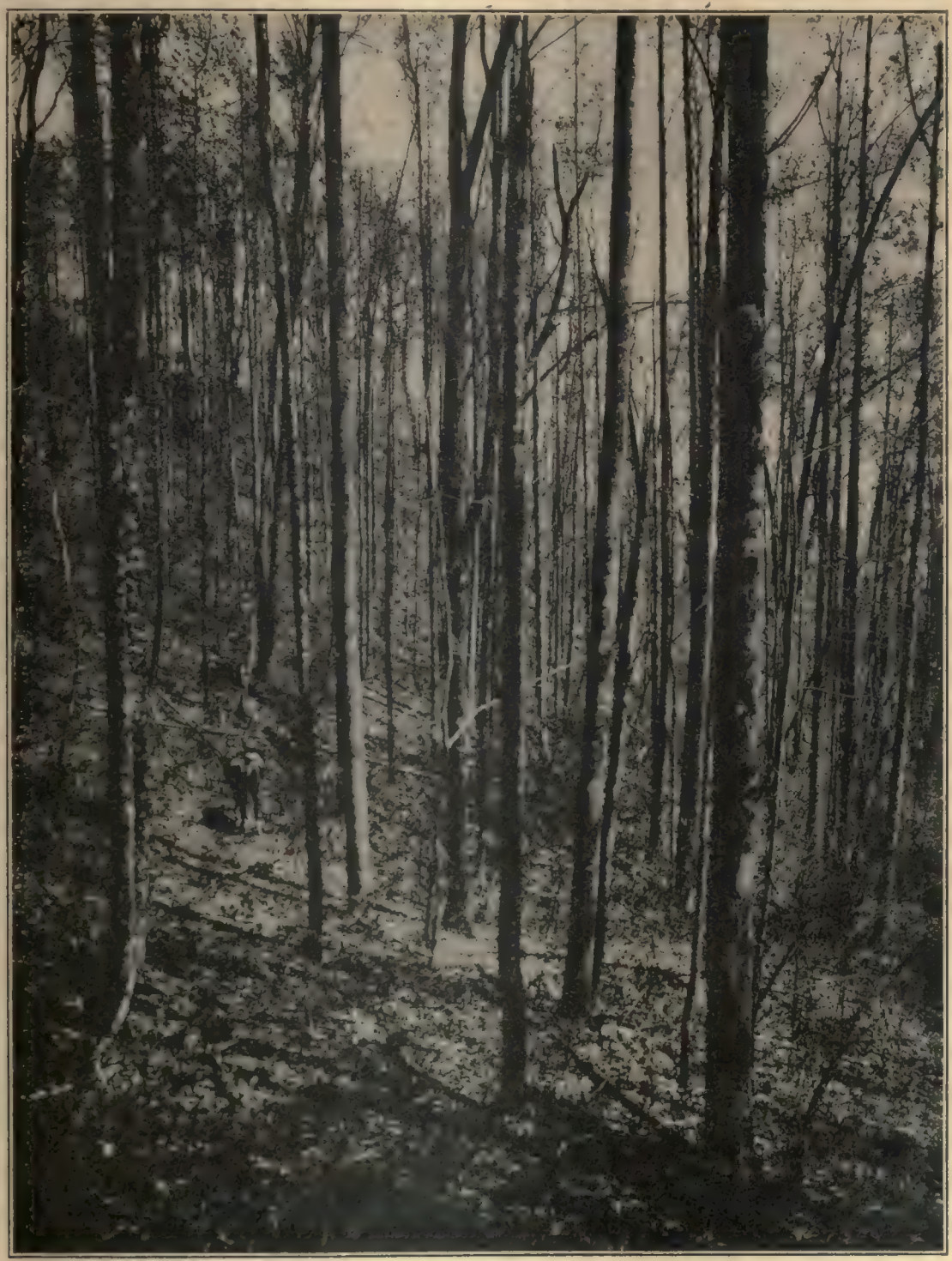


SECTION SHOWING TYPICAL FOREST CONDITIONS

This beautiful bit of woodland shows unlumbered spruce as it was found on lands purchased for forest reservations.

Representatives authorizing the recommended appropriations.

The 1,841,934 acres which have been or are being acquired are being purchased at an average price of $5.26 an acre. It is believed that purchases have been judiciously made and that, since the merchantable timber has very greatly increased in value, they are now worth much more than the amounts paid for them. In addition to their protective function, these lands are already demonstrating that financially they will be an excellent investment. There seems to be a widespread opinion that the Government is acquiring very large cut-over or unproductive lands. This is by no means the case, as is indicated by the income from the Forests. Many of the purchases, however, are lands which through neglect by prior owners have been burned and their earning capacity greatly reduced, or they are cut-over lands or lands in young timber which can yield no immediate returns, though all lands so classed have productive capacity. The cutting of timber by the Government on the acquired



SECOND GROWTH STAND

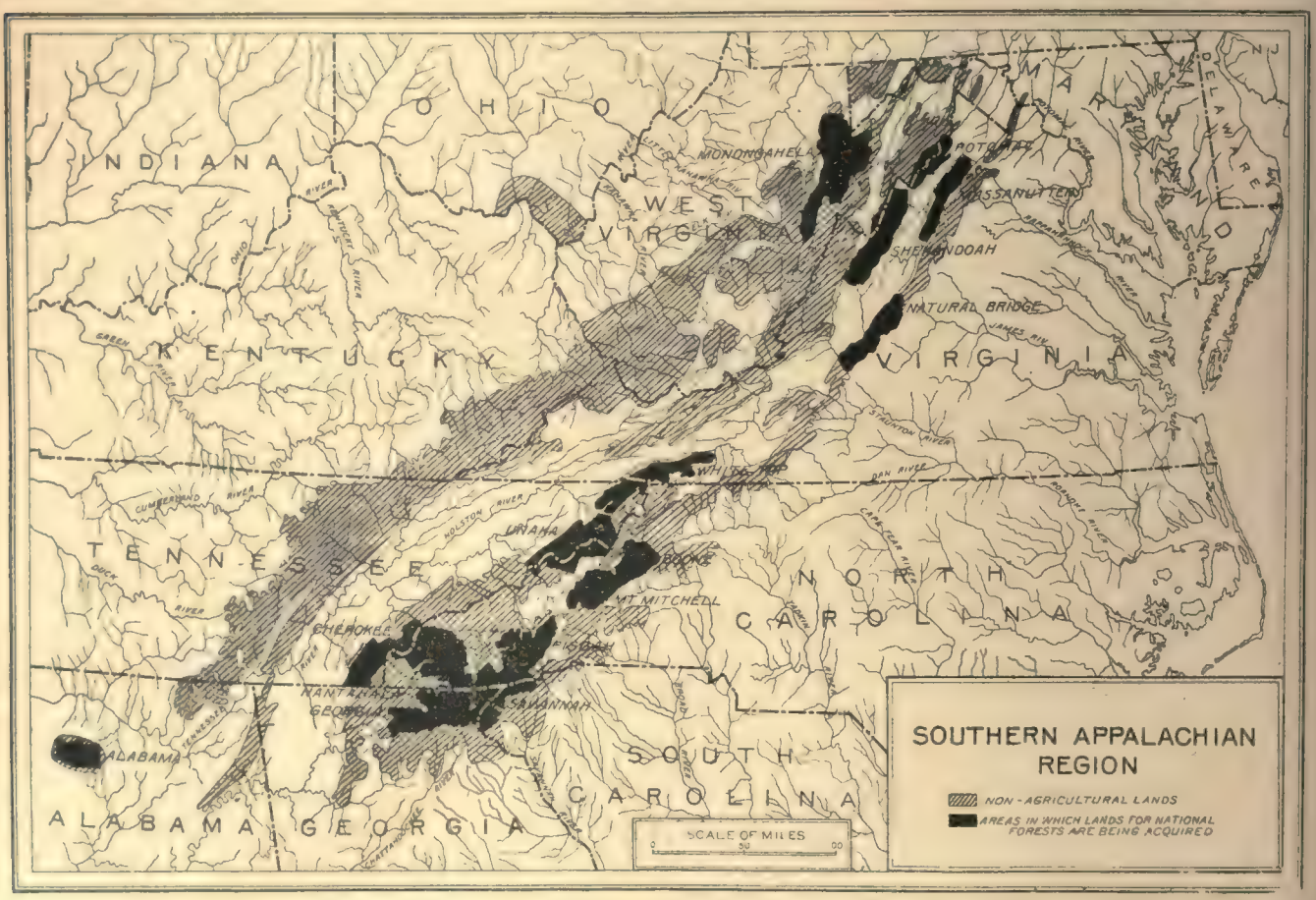
Yellow poplar and chestnut, pole size, on purchased land. This shows the general character of lands being acquired in the Southern Appalachians.

lands is extremely conservative, less timber being sold each year than the estimated annual replacement by growth. In spite of these conditions, the receipts for the fiscal year 1919 on the then acquired area of 1,347,660 acres amounted to $71,942.

Increase in population and expansion of industry have been confronted with a constantly decreasing acreage of timberland from which to draw lumber, wood for paper manufacture, tanning materials, and other uses. As a means of meeting this constant demand the National Forests were created from the public domain. The purpose of the National Forests was, by regulating cutting and by the protection from fire of forest lands, especially when cut over, to assure timber for future industrial

The Weeks law, for constitutional reasons, limits purchases to lands which promote navigability of navigable streams. But the benefits to navigation through the maintenance of an equable stream flow by the conservation of the precipitation on the watersheds and through reducing deposits of silt in channels are not the sole advantages to be derived. As a provision for the maintenance of a supply of hardwoods and of spruce for pulp and for airplane construction the measure is of prime importance.

The tendency of the forest cover, when kept in good condition, to promote absorption of heavy rainfall renders the maintenance of woodland an essential consideration in any project seeking to mitigate floods and to reduce



use. These forests, however, contain only about one-fifth of the timber supply of the country. Furthermore, except for small and relatively unimportant areas in Florida and Michigan, the entire forest system created from the public domain is located west of the Mississippi River. There was at the time of the establishment of the National Forests no adequate provision for maintaining the timber supply of the Eastern States. The eastern supply of hardwoods is of special importance since the timber of this class is practically limited to the Eastern States and to restricted areas within these States. Discussion covering a number of years and looking particularly to measures for maintaining a supply of hardwood timber for American industries eventually culminated in the Weeks law.

flood losses on streams which head at high altitudes in the eastern mountains. At the same time there is an accompanying benefit to water-power development in lessening sedimentation, which lowers the storage capacity of reservoirs, as well as in equalizing stream flowage, especially in increasing the dry season flow.

A collateral advantage is that enjoyed by such towns as secure their supply of domestic water from watersheds in whole or in part owned by the Government and lying within the forests. There are 17 municipalities, including 4 large hotels, which now make use of this privilege, while 29 municipalities and 5 hotels secure their supply from lands which have not been acquired but which are located within the purchase areas. Government control assures the sanitation of such water-

sheds without interfering with the use of the land for timber producing purposes.

A further function which can not be measured from a purely monetary standpoint is the use of the forests for recreational purposes. Rendered accessible by means of roads and bypaths they become public playgrounds. Also certain restricted areas have already been designated as game preserves for the breeding of wild life, uses which in no way detract from their essential economic service.

There have been located under the Weeks law in nine States in the very important hardwood and spruce regions of the Appalachians and White Mountains 21 purchase areas, on 17 of which purchases have been authorized by the National Forest Reservation Commission. These purchase areas have an area of nearly 7,000,000 acres,



CUT-OVER SPRUCE FOREST

This photograph was also made on a tract in the area purchased for National Forests, and is characteristic of the condition of cut-over spruce forest.

including some interior farming land. They comprise the White Mountains, the Monongahela, the Potomac, the Massanutten, the Shenandoah, the Natural Bridge, the White Top, the Unaka, the Boone, the Mount Mithcell, the Pisgah, the Savannah, the Georgia, the Cherokee, the Nantahala, the Alabama and the Arkansas and Ozark Purchase Areas. Since the purchase program was developed, other States, including Kentucky, in which conditions seem to meet the requirements of the law, have enacted legislation authorizing the acquisition of lands for National Forest purposes. A further appropriation of the kind which has been recommended, covering a period of years, would be expended primarily in acquiring lands on areas which have already been located so as to secure consolidation and more efficient administration, and with the further object of extending the policy to new units located particularly in States in which no purchase areas have as yet been established. The tota' area of hardwood and spruce lands in the mountains of the Eastern States which is unsuited for agricultural purposes and which should be maintained in productive forests is in excess of 30,000,000 acres.

A TREE GAME

1. Which tree a kissing game could play?—Tulip
2. And which its father's name could say?—Paw-Paw.
3. Which shall we wear to keep us warm?—Fir.
4. And which do ships prefer in storm?—Bay.
5. Which shows what lovelorn maidens do?—Pine.
6. And in your hand which carry you?—Palm.
7. And which is it that the fruit men fear
 Which makes a call each seventeenth year?—Locust.
8. And from their pipes men shake which tree?—Ash.
9. Which tree does a bad boy hate to see?—Birch.
10. Which like a man bright, dapper, neat?—Spruce.
11. Which is a girl both young and sweet?—Peach.
12. And on which do the children play
 With pail and shovel all the day?—Beech.
13. And to which tree shall we now turn
 For goods to wear and stuff to burn?—Cottonwood.
14. And now divide you one tree more
 You've part of a dress and part of a door?—Hemlock.
15. Which tree is never seen alone?—Pear.
16. And which in church doth office hold?—Elder.
17. And which is a town in Ireland old?—Cork.
18. For this one do not look so far
 Which tells what charming people are?—Poplar.
19. The carpenter doth use which tree
 To make his wall as straight as can be?—Plum.
20. And to which tree do urchins call
 To show you shouldn't have looked at all?—Rubber.
21. Which tree on calendars find you?—Date.
22. Which is a joke told times not few?—Chestnut.
23. And on our feet we'll wear which tree?—Sandalwood.
24. And which our hero's crown shall be?—Laurel.
25. Another tree to find just try
 For fish and fuel for a fry?—Basswood.
26. Now, last of all, what tree have we,
 The first an animal faithful indeed,
 The second our country's industrial need?—Dogwood.

HOW LONG DOES IT TAKE A TREE TO DECAY?

THE accompanying photograph taken just outside the city of Vancouver, Canada, throws some interesting light upon the subject. The log which is down beneath the roots of the big stump is of fir, a comparatively soft wood. The stump, the roots of which cover it, is of cedar. The cedar tree of which this stump was once a part had a diameter of more than three feet, as even



EVIDENCE OF THE LASTING QUALITIES OF FIR

Though dead and down for over seven decades this old fir log has not even begun to soften.

now, after being partly eaten away by fire, the stump is twenty-six inches across, indicated by the outstretched arm of the man measuring twenty-six inches from armpit to fingertips. To reach such dimension the cedar must have been at least seventy-five years in growing, in the estimation of a man who has given his attention to such matters.

This fact throws an interesting light on the question of how long it takes a fallen tree to decay. As may be seen from the position of the two immense roots of the cedar, the fir log must have fallen when the cedar was a seedling. Very possibly the fir may have been down before the cedar ever started to grow. As the little cedar sapling grew taller its roots were forced to encircle the log as seen. Though the fir log has been down at least seventy-five years, its wood is still hard with the exception of an inch on the outer surface. This slow decay of even so soft a wood as fir in a country like British Columbia, where in winter frost often follows weeks of rain, and where the summers are hot and dry, a combination of climatic conditions greatly furthering decay, gives some idea of the immense length of time which harder woods will last, for the fir, though down at least seventy-five years, has not even begun to soften.

THE WALNUT—OUR NATIONAL TREE?

SHALL the American walnut be adopted as our national tree? Several such inquiries have been received by AMERICAN FORESTRY recently. Certainly it has many claims to such recognition. But so have others, their admirers will say. What do the lovers of walnut claim for it?

One writer says:

"There is probably no tree better known in the United States than the walnut tree and certainly the record of the wood is one of which we are all proud. The suggestion I would like to make is that the American walnut be adopted as our national tree. England has her oak, Canada her maple, Italy her olives, Germany her linden, Japan her cryptomeria, why not America her walnut? Walnut as a tree awakes fond memories in the heart of nearly every native born American. The tree grows naturally in the region occupied by four-fifths of the people of the United States and has been planted and grown successfully in every State in the Union.

"The wood itself is inferior to none of the world's best cabinet woods and in fact is superior in most respects. Its beauty of color and figure together with its well-nigh perfect physical characteristics qualify it as the leading candidate as our national representative among the forest products of the world.

"It is quite true that walnut is not as plentiful as some of the other woods, but this is a point in its favor. There were not many Theodore Roosevelts but we are glad to think of him as a representative American. Walnut is good enough to be a representative American. There is apparently enough walnut in the country to give us a sustained cut of some 50 million feet a year, and this will cover our needs in this cabinet wood. If the tree is planted and young growth protected there is no reason why we should not always have plenty of walnut. In times of peace it gives us a wood for the best and most artistic furniture, in war it gives us the one reliable wood for gunstocks and airplane propellers. The tree itself gives shade but does not kill the grass beneath, thus leaving a lawn or pasture. The wood is superior for farm use, is a good fuel and is durable as posts. The nuts are marketable at good prices when produced in excess of local consumption. When the trees are mature they are marketable at better prices than can be obtained for any stumpage anywhere in the world. Mahogany stumpage sells at from 50 cents to $5.00 per 1,000 board feet.



THIS GIANT WALNUT STANDS IN THE CITY PARK AT PIQUA, OHIO. AND IS 12 FEET IN CIRCUMFERENCE, MEASURED THREE FEET FROM THE GROUND

"I wonder how many memorial trees planted in honor of soldiers were walnuts. If you can think of a better tree than walnut as our national tree, please tell me what it is and I promise never to mention it to anyone."

All of this is a first-class argument in favor of the walnut. Evidently forestry departments of several States believe in it too, for recently in Ohio, the Agricultural Experiment Station published a pamphlet by Edmund Secrest, of the Forestry Section, on the cultivation of these trees, attention being called to the great value of the lumber in many industries and its use in the Great War for air-

(AMERICAN FORESTRY makes grateful acknowledgment to the American Walnut Manufacturers Association for much of the material and many of the cuts used in this article.—EDITOR.)



AMERICAN WALNUT LOGS, HEWN OCTAGONAL FOR EXPORT. MANY LOGS LEFT AMERICA BEFORE THE WAR IN THIS FORM. SINCE THE WAR THERE HAVE BEEN BUT FEW SUCH LOGS SHIPPED TO EUROPE

planes and gun stocks, for which no other substitute could be found in sufficient quantities. Mr. Secrest says that with proper care trees may be grown from seed or transplanting of small trees to a state of maturity where the wood will be of as great value as that of the original forest.

In Pennsylvania the State Forestry Department has undertaken extensive seed planting in an effort to restore the black walnut. One hundred fifty bushels of seed have been planted in especially prepared ground at Mont Alto and should produce 100,000 seedlings for next spring. Many requests have been received from owners of woodland who desire to start groves of the trees.

Walnut which had been originally specially selected for the manufacture of gun stocks for the use of the Allied Armies has been used to make what is probably the most beautiful interior of a religious structure in the country, that of one of the Methodist Churches in Kansas City, Missouri. The entire interior—trim, furniture and pews—is of black walnut, even the paneling about the side walls and pipe organ being worked from a single walnut log, a specimen of the kind for which experts are always on the lookout but seldom if ever are fortunate enough to find.

The beauty and grain of the wood conduces to harmony and richness of tone, the soft colors of the walnut being so fitted and blended that they produce the effect of a great painting, where the qualities of simplicity and depth predominate.

The family name for walnut is derived from "Jovis Glans," or nut of Jupiter. In ancient times, walnut was called "Regia," or royal, and "Juglans Regia" is the name of the European walnut. This species is spread over Europe and has been planted in California. The white "English walnuts" of commerce are of this species, as is also the cabinet wood known as "Circassian walnut." The Circassian walnut wood of commerce comes from near the Black Sea, where the trees grow under very unfavorable conditions, their struggle for life producing the weird, twisted, streaked wood which was once so popular as a cabinet wood.

European authorities and craftsmen have long been partial to American walnut, agreeing in its superior color, figure, strength and texture to the wonderful walnut grown in Italy, France and Spain.

American walnut (or black walnut, as it is often called) ranges from Massachusetts and South Ontario west through the southern half of the Lake States to Middle Nebraska and Kansas, to Central Texas and Northern Florida. American walnut was called "Dent-soo-kwa-no-ne" by the Indians of New



A PLANTED GROVE OF AMERICAN WALNUT TREES ALREADY PRODUCING AN ABUNDANT CROP OF NUTS. NOTICE THAT EVEN A HEAVY STAND OF WALNUT TREES DOES NOT KILL OUT THE GRASS



FRENCH FIFTEENTH CENTURY DOORS OF CARVED WALNUT, ILLUSTRATING THE WIDE RECOGNITION OF THE VIRTUES OF WALNUT EVEN AT THIS EARLY DATE

York; the value of its wood was early recognized and used by the settlers for rails, buildings, furniture and rifle stocks.

It was cut out far in advance of other timber, but up to 1850 it was fairly abundant. From 1850 to 1875 it was widely used and much of the best timber was cut in the then accessible regions. From 1875 to 1900 the production of walnut dropped slowly from 125,000,000 feet a year to about 50,000,000 feet yearly.

Since 1900 the annual figure has remained about 50,000,000 feet, until the Great War, which brought out an average of nearly 100,000,000 feet per year between 1914 and 1918. To be sure, American consumption of walnut dropped steadily from 1875 to 1900, but the foreign market for walnut increased correspondingly.

Walnut has found its principal foreign markets in Great Britain, France, Germany, Austria, Denmark, Sweden, Russia, Holland, Spain and Italy—England and Germany being heretofore the principal markets. For twenty years prior to the outbreak of the World War, Germany had been importing walnut logs from this country for veneer, but it is now a well-known fact that at least a great part of this material was manufactured into a reserve store of gunstocks.

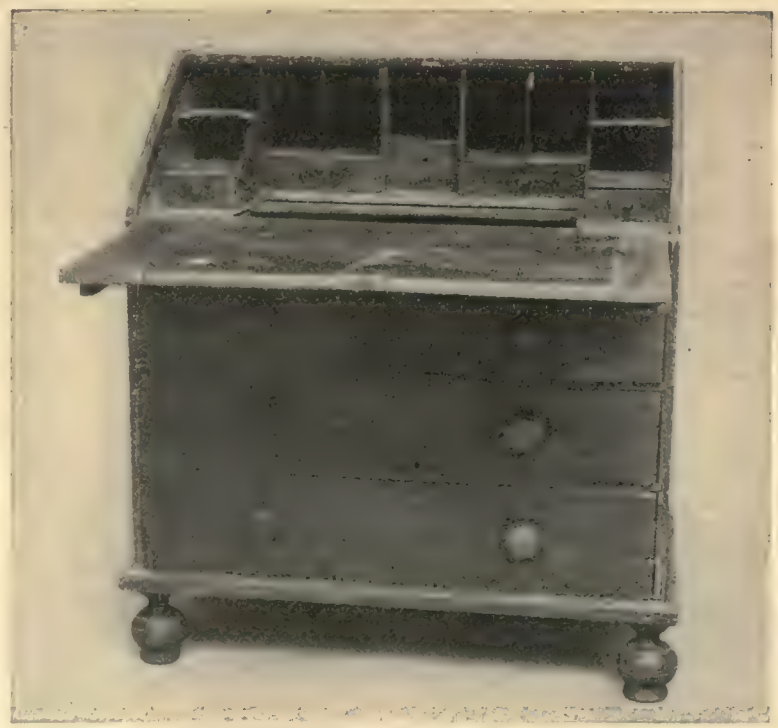
Some twenty years ago the logging of the walnut became different from that of other woods.

This tree had always been a favorite and had been preserved and planted all over the country. As a result, there were millions and millions of trees scattered over the farming sections of the country.

A practice grew up of collecting logs at a convenient shipping point from the surrounding country. Trees would get old and die, be struck by lightning, or the owner be in need of ready cash; so walnut trees could always be bought. Since 1900 this practice has increased, until today the greater part of the walnut produced is picked up, a tree here and a tree there, and shipped to the mills. During the war it was this system which made it possible to supply the United States and Allied Governments with the countless millions of feet for gunstocks and airplane propellers.

The results were a revelation even to the experienced walnut men and to forestry experts. It was discovered that a steady walnut production could be maintained almost indefinitely, the demands of the war scarcely scratching this source of supply.

The forests formerly contained some magnificent specimens of this splendid tree. Even within the last few years specimens have been cut measuring five and six feet in diameter. Many years ago there was standing in Floyd County, West Virginia, a tree seven feet in diameter, while in Letcher County there was a rather short bodied walnut nearly nine feet in diameter. A great many trees averaging from four to six feet on the stump came down the Big Sandy River to move on the Ohio and were exported during the period between 1870 and 1890. The average forest growth, however, was from twelve



EARLY AMERICAN HOMEMADE WRITING DESK OF WALNUT. THIS PIECE WAS PROBABLY WROUGHT BY THE GRANDFATHER OF THE FAMILY AND SO VENERATED AND APPRECIATED AS A REAL HEIRLOOM BY THE YOUNGER GENERATION

to thirty-six inches in diameter. Many of the old trees were sixty feet or more to the first limb.

As with all trees, the stem or trunk of the walnut tree is usually the most valuable. Generally, the trunks of walnut trees are straight-grained and show but a small amount of figure.

In the average tree the only place where a decided figure is found is in the stump. Most every stump shows a wavy grain at a point where the roots begin to spread out from the base of the tree. It is therefore a fact that most of the figured walnut used comes from the stumps, though it is doubtful whether more than one stump in a hundred is suitable for this purpose.

Such stumps are carefully dug from the ground and transported to the mills where they are trimmed and quartered. These quarters are then placed upon veneer machines where they are cut in such a manner as to take advantage of the peculiar grain of the wood.

Another form of figured walnut is to be found in what is commonly known as a burl. These burls are huge growths which may be found at any point on the trunk of the tree, but more commonly at the roots. They often weigh from 500 to 2,000 pounds, and are prepared and cut in a manner very similar to that in which stumps are handled, but only an occasional specimen furnishes sound wood. A very notable example of a burl was to be found at Mount Vernon a few years ago on a large walnut tree growing at the side of Washington's grave. This particular burl, however, had been used as a bees' nest for many years, which made it worthless.

The regard in which walnut is held is shown by the care given the walnut trees that come up wherever a seed gets a chance to grow. Walnut reproduction has been protected more than that of any other American tree, and as a result there are millions of trees growing up which will some day produce good timber. With all this haphazard care, however, enough importance is not attached to the encouragement and planting of this grand tree. No farm should be without its clump or row of walnuts, and the life of no child is complete without having gone "walnutting" after the first heavy frost in the autumn.

The story of the use of walnut for furniture is intensely interesting.

The earliest recorded use of walnut was in Nineveh and in King Solomon's time when ebony, teak and Indian walnut were used.

There is in the British Museum the remains of the oldest piece of furniture in the world. It is the throne of the mighty Queen Hatshepsu who ruled Egypt in the far-off days of the eighteenth dynasty. This chair has legs carved to represent bulls and a cobra wrapped around each leg. The British Museum also has turned chairs and stools made about 1500 B. C., which show that the artisans of ancient Egypt well understood turning, veneering and inlaying.

The Romans, during the time of the Empire, used walnut probably in considerable amounts as a veneer over cedar. Veneers were cut, not for the purpose of economy, but because by this means the most beautifully marked or figured specimens of the wood could be applied and a much richer and more decorative effect could be produced. It is only by the use of veneer that the wonderful figure in walnut grain can be justly shown. It is of importance, however, to the buyer of furniture, that walnut veneer for beauty should be used only with solid walnut for true value as a basis, because that is the only way to be sure of getting real walnut furniture.

This is of enough importance to justify a definite guarantee from maker and seller that the veneer by its beauty does not mask an inferior and less valuable base wood, but that the buyer may be assured of securing the utmost and rightful value which can come only from



HUGHES SAMBIN STYLE WALNUT CABINET, FRENCH, CIRCA 1550. METROPOLITAN MUSEUM OF ART, NEW YORK



EXAMPLE OF FRENCH SIXTEENTH CENTURY CARVING IN WALNUT. A DETAIL OF A MOST ELABORATE WALNUT CABINET

solid walnut—with or without veneers.

Walnut was much used in Venice, which was then the center of art, where it was carved into all kinds of furniture and used as a ground-work for veneers. In Milan, the Italian brown walnut was used for certosina work, inlaying with bone and ivory. In the Victoria and Albert Museum is a Florentine folding chair of walnut made in 1520. The furniture styles of the Italian Renaissance form the starting point and source of inspiration for all succeeding styles. The period of the Renaissance marked a great revival of learning, a general emergence from the dark ages. It was European in scope, but had its beginning and highest development in Italy. The classic spirit, which effected so great a change in architecture, was further exemplified in the form and ornamentation of furniture. Carved woodwork became the vogue in interiors and furniture styles followed this lead.

The interior woodwork of this period was noteworthy. Italian walnut was much used, carved and pannelled. The cabinet became the most important piece. The chairs were mostly huge, stately with carved perpendicular backs, flat square seats and arms, with no thought of comfort.

Gothic details of carving persisted until the sixteenth century. The lives of Saints as motifs went out of style and pagan elements crept in. Handsome chests of solid walnut, cabinets, tables and chairs were made, though styles were palatial rather than domestic. Artists and cabinetmakers came from other countries and the spirit and styles of Italian Renaissance swept across the continent.

Some Renaissance furniture was richly inlaid with ivory and bone into walnut. Fine Intarsia work on walnut, copies of marble mosaic, geometric, floral and pictorial patterns became common.

Cerule or Savonarola chairs on the Roman Model X were often made of carved Italian walnut, and these are quite usable today. Savonarola chairs, mirrors, occasional tables, cabinets or chests are about the only types of true Italian Renaissance furniture which would be suitable for modern homes. The records show that these master Empire builders, the Romans, introduced walnut trees into England, but that walnut was not introduced in quantity until 1565 A. D. These sixteenth century trees were allowed to grow in their majesty and beauty for nearly a hundred years, and not until the later days of Queen Elizabeth were they cut and used in any quantity. The earliest examples of furniture now in existence from the early middle ages in Europe are coffers. The wooden coffers, which gradually became a receptacle in which smaller boxes could be stored, is the forerunner of the cupboard, and there are authentic specimens of these early coffers made of walnut in a few private collections and museums. Walnut chests of the fifteenth century are to be found in the Victoria and Albert Museum. The sideboard was first, literally, a board fixed against the wall, gradually developing by the addition of props or legs in front, then in the back, then a double shelf later enclosed, into an independent piece of furniture.

Authentic walnut furniture of the Tudor period still exists in England. By the time of Charles II, walnut was the principal furniture wood, although, during the Jacobean or Restoration days, its use, due to its superiority in fine, smooth grain was steadily increasing.

The fierce fanatic zeal of the Cromwellian period caused the destruction of most of the now priceless treasures in furniture, and the succeeding years saw great quantities of furniture made to replace this destruction.

During the reign of William and Mary there began what has been termed the "Age of Walnut." These monarchs brought to England walnut furniture in the Dutch and Flemish styles, of which some fine examples are to be found today in Hampton Court. There is in particular a set of ten walnut chairs with cabriole legs, feet carved as hoofs, and carved stretchers. Old English lacquer work very often had walnut as a base due to the unchangeableness of the wood. The Dutch influence is shown in all the furniture made at this time, and walnut chairs made during the Queen Anne period are said to be the first in which the human anatomy and real comfort were given any consideration. After the period



SIXTEENTH CENTURY FRENCH CARVED WALNUT TABLE. METROPOLITAN MUSEUM OF ART, NEW YORK



ENGLISH SEVENTEENTH CENTURY ALL-WOOD WALNUT WAINSCOT ARMCHAIR

of the purer forms of the first Renaissance the best time for carved woodwork and decorative furniture in the Netherlands was probably the seventeenth century, when Flemish designers and craftsmen had ceased to copy Italian patterns and established the style we recognize as Flemish Renaissance.

The seventeenth century also gave the best examples of English work, marked by increased refinement of design, soundness of construction and thorough workmanship made possible by the use of walnut.

At this time cozy or grandfather's chairs were made of walnut, and with sumptuous upholstery, marked the introduction of real comfort into the design and construction of furniture. This period marked the evolution of the winged sleeping chair and the love chair or settee.

The use of walnut contributed largely to the wonderful development of marquetry or inlay work in England, France and Italy, as the rare fidelity and trueness of walnut under all conditions permitted the exact cutting necessary to perfect inlay work.

Walnut was much used in the manufacture of pianos in Queen Anne's time, and not only the case but the keys were made of walnut.

What is known as the decorative Queen Anne period marked the advancement of cabinet work in its finest expression of skill through elaborate carving and embellishment. This progress was also possible through the superiority of walnut for cabinet uses.

The period of Queen Anne marked the development of a real English style of furniture on Dutch lines. The beginning of Queen Anne, about 1700, divides ancient from modern furniture. Then curves came in as a feature of design and with them the cabriole leg, and no underbracing. Attention turned to form rather than ornament. The common folks then had Windsors, straight slat backs, and banister back chairs. Walnut was used extensively.

In the Georgian period, ball and claw foot legs superseded the round Dutch foot designs on footed furniture. English styles then passed through periods of French Rococo, Louis XV, Chinese and Gothic elements, until classic and Louis XVI features predominated. Chippendale contributed largely to the modification and improvement of the Queen Anne styles. Considerable quantities of figured walnut came into the market during the Georgian period and much of this was veneered, producing very pleasing effects.

There are some notable examples of fine carved walnut tables in private collections in England, and a very few in America, which mark the great popularity of this type of furniture in the decade 1720 to 1730. Walnut was used in the old grandfather's clocks in the period from 1720 to 1735. There is a fine old burl walnut clock in the Victoria and Albert Museum.

Dean Swift, that eccentric whose caustic wit and literary brilliancy made a page of England's history, was the possessor of a solid walnut writing cabinet of great beauty.

It was at this time that the artistic genius of the Brothers Adam, of Chippendale, Heppelwhite and Sheraton found expression in several styles which are identified by the names of their originators.

The chief distinction between previous styles and the work of these masters lay in refinement of design and



TYPICAL ENGLISH SEVENTEENTH CENTURY TURNED WALNUT ARMCHAIR



WALNUT ARMCHAIR OF ENGLISH MAKE, SEVENTEENTH CENTURY (PERIOD OF CHARLES II)

consistency of line. Their furniture was smaller— truly refined in size and proportion—the backs and legs of chairs were harmonious in design, and beauty was expressed in form rather than by bulk.

Thomas Chippendale began his career as a maker of walnut furniture and developed the reputation of choosing only the best material for his work. The famous Kateshill walnut chair was made by Chippendale. He also used walnut in his beautiful mantel clocks.

Robert Adam was an architect who designed furniture to harmonize with architecture or interior decorations, and his furniture was largely made to meet special requirements, although so distinctive was his style, modeling along the general lines of the Louis XVI styles, that his impress has been the inspiration for generations of later designers. Some of his finest work was done in walnut.

Heppelwhite established a wide reputation as a furniture designer and builder. It might be said that his work marks the transition from Chippendale to the classics of Adam and Sheraton. He particularly reduced the size of pieces and introduced the more feminine lines of grace and beauty. It is an interesting historical fact that the famous sideboards commonly attributed to Heppelwhite were really designed by Shearer. The finest of Heppelwhite designs are best reproduced in dark, straight grain, unfigured walnut. This is also true of the delicate models of Sheraton, who was a designer and publisher of engravings rather than a furniture maker. Possibly this explains his development of beauty along lines of form and proportion rather than by accentuated oddity and intricate carving.

In these facts we have an unusual evidence of the basic superiority of walnut as a cabinet wood. All through the centuries it has been the truest medium of expression for what successive periods have deemed most beautiful and worthy in furniture design. From the massiveness of Flemish, the elegance of Italian and French, and the balanced beauty of eighteenth century English, walnut by its inherent qualities has been the one cabinet wood that fulfilled all demands.

The Victorian Age developed no really new styles in furniture. It was generally of plain, indiscriminate style with sombre upholstery on mahogany wood which was inartistic in coloring and crude in form and finish.

A revival of art came later and with it a revival of the classic styles in furniture, principally through those old pieces made of walnut which throughout the years had shown no deterioration in physical qualities and had, with age, grown more beautiful in color.

The very earliest American furniture was that brought from England, Holland, France or Spain, and was of course of the style and wood prevailing in these respective countries at the time. This



EXCELLENTLY PROPORTIONED WALNUT CHAIR WITH VELVET UPHOLSTERY. STYLE, WILLIAM AND MARY, 1689-1702

accounts for the fact that many of the old pieces were made in walnut. Trinity College has a richly carved walnut chair of the Italian style of 1640.

Other interesting pieces linked with Colonial days have been mentioned.

Furniture made of Virginia walnut found its way as far as New England (a long distance in those days), and furniture made of this wood was produced by manufacturers in Philadelphia in the Revolutionary days, their work being responsible for many excellent pieces. Some of the earliest rocking chairs, that distinctively American invention, were made of black walnut. What we know as the "bureau" is an American production dating about 1727 and the name was originally spelled "buerow."

It is an interesting fact that in the early days of our republic, we produced a master craftsman, Duncan Phyfe, of New York, whose work bore impress of genius that ranks him with the widely heralded designers of the Georgian Age.

By 1750, the cabinetmakers of Philadelphia had surpassed those of England in design, workmanship and quality of stock used.

They had a decided advantage in their choice of materials, as indicated by the following quotation from Moore's *Old Furniture* Book: "The material used for nearly all William and Mary and Queen Anne pieces of native make (and most of them were the work of local joiners) was a singularly beautiful black walnut of deep, rich color that lent rare distinction to any article for which it was employed."



WALNUT STUMPS FOR THE MANUFACTURE OF BEAUTIFUL FIGURED VENEER

Walnut is indelibly written into early Colonial history. In 1633 Governor Winslow presided over his councils in Pilgrim Hall at Plymouth with the aid of a walnut table.

As a mark of especial regard, Mrs. Washington, the mother of George, "father of his country," selected a fine walnut writing table for a bequest to her granddaughter, Betty Carter.

Madam Steenwych (noted for her suppers) had a fine cupboard of walnut, and Nicholas Van Rensselaer had a walnut chest.

In 1705, an inventory shows "fine chest of drawers of walnut wood."

Governor Burnet of New York and Massachusetts, 1729, had leather-bottom walnut chairs.

The inventory of Peter Faneuil of Boston in 1742 shows that he owned twelve walnut frame, leather-bottom chairs.

Rev. Theophilus Pickering of Salem in 1724 made good furniture of walnut, which was the wood he most used.

Windsor chairs were advertised in 1768 by William Gautier of New York.

The choicest of old Dutch chests or "Kas" were made of walnut



FRENCH LATE SIXTEENTH CENTURY WALNUT PANEL 400 YEARS OLD AND AS SOUND AS WHEN MADE

ITALIAN NINETEENTH CENTURY CARVED WALNUT SCREEN BY FRULLINI

FLORENTINE STYLE WALNUT PORTFOLIO CARVED BY FRULLINI, NINETEENTH CENTURY

ITALIAN NINETEENTH CENTURY TABLE OF WALNUT BY FRULLINI. FLORENTINE STYLE



ANOTHER OF THE MANY BEAUTIFUL FIGURES OBTAINED IN MATCHED WALNUT VENEER

exampled by the famous one belonging to the Albany Historical Society, which is eight feet high and of unusual beauty.

The following is an "ad" from the *Weekly Mirrior* in 1774—"To be sold at private sale—a large black walnut cupboard with a set of Delft."

Walnut furniture was commonly listed in the American claims for damages by British soldiers in the Revolutionary War.

"The question of our available supply and how long it is going to last is always one of the first brought up in a walnut discussion," writes F. S. Baker, of the United States Forest Service.

It is particularly interesting at the present time when what was popularly supposed to be a commercially extinct species has suddenly appeared to be so plentiful. To say just how much we have in board feet is difficult but it is probably not far from one billion feet board measure. It is a more meaning statement to say that we have enough to assure a sustained annual cut of 50 million feet. This was claimed, before the war, by H. A. McCowan, an exceedingly well-posted black walnut manufacturer. Of course the war cut has eaten into the merchantable growing stock very badly. On the other hand a slump in the walnut market in the next few years will allow a recovery of this temporary overcut. Just how much of a slump will actually occur is hard to forecast. Our domestic markets normally absorb only about half of the total cut or about 25 million feet, and how fast our foreign trade recovers is especially problematical.

It appears that we can carry on a nice little business of 50 million feet a year indefinitely—if we have that thing seldom found outside of text books—"normal gradation of age classes."

If getting at the amount of merchantable walnut in the country is largely a guess, the determination of the immature growth is something still worse. Opinion, in the West at least, is very much agreed, however, that we have plenty of young walnut down to six inches D. b. h. and then practically nothing at all. The sudden lack of reproduction is very noticeable everywhere, and is rather hard to account for or even to believe in at first. It seems due to a number of factors incident to settlement of the country and intensive agricultural use. Most woodland is grazed by cattle that destroy the young trees of all kinds and by pigs that eat the walnuts befor they have been long off the trees. Barbed wire fences have replaced the zigzag pole fences that offered protection to all kinds of wild forest growth, and cultivated lands and pastures come

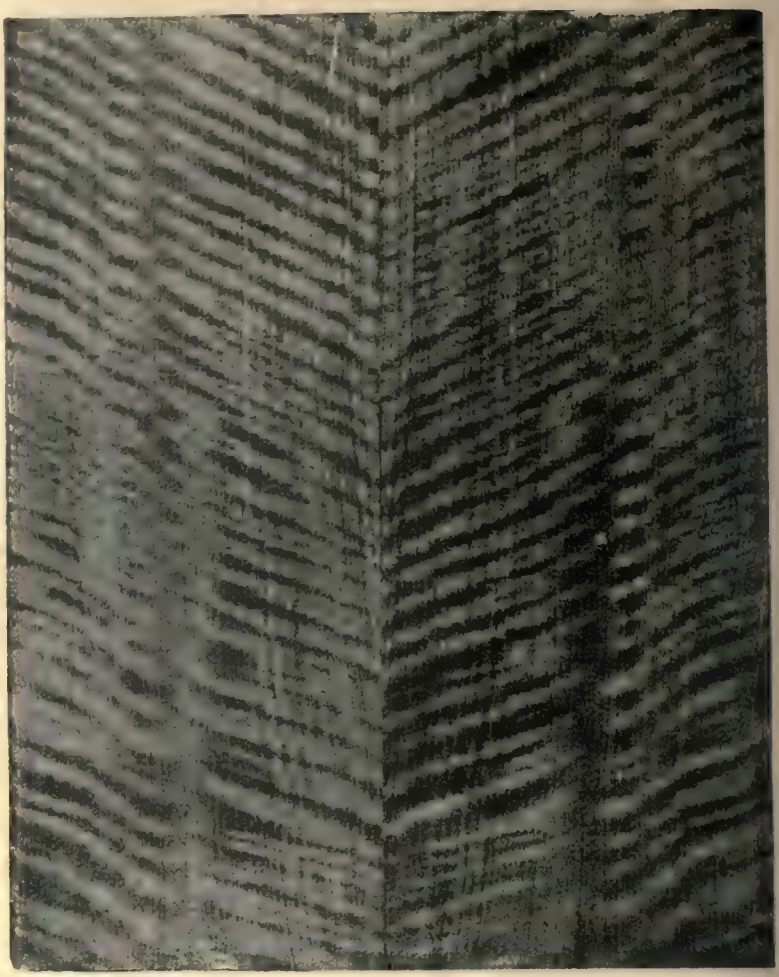


A BEAUTIFUL, LUMINOUS PIECE OF WALNUT VENEER

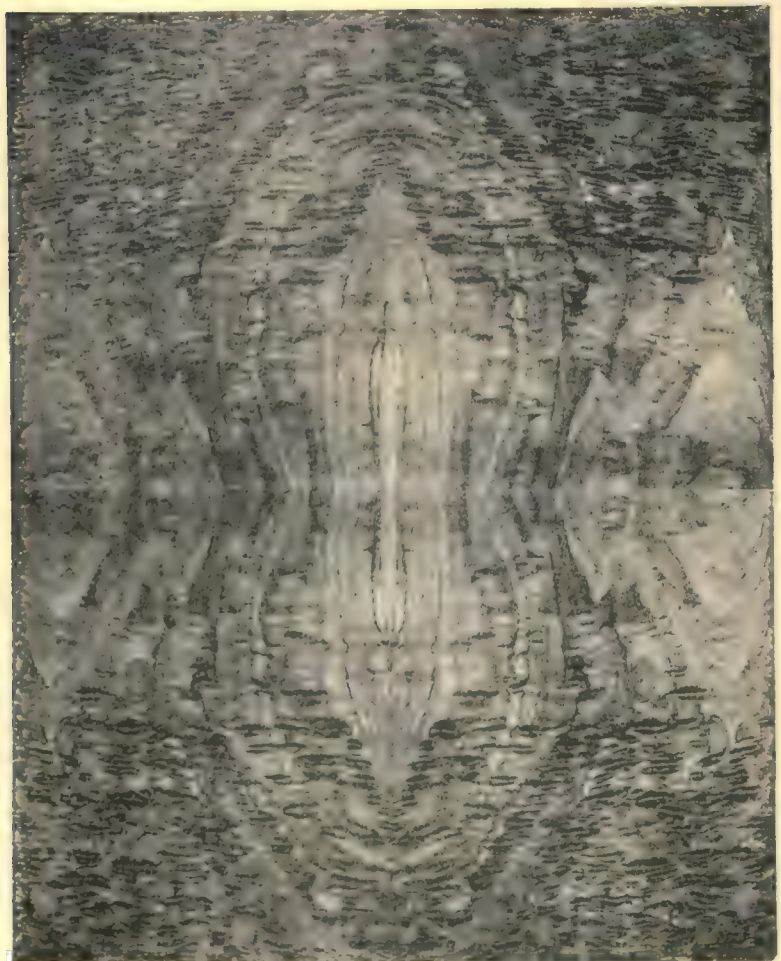
close up to the woodlots on all sides even when they are not grazed. Originally the squirrels planted many nuts. Settlement has decreased their number and possibly their habits. As a result of all these factors there is little walnut reproduction.

"The future of our walnut business, in the West at least, depends upon immediate artificial propagation of this species. It is not at all difficult to start a walnut plantation and probably several hundred of them exist throughout the prairie states. The case of an Indiana farmer shows as well as anything the ease with which a stand may be secured. One fall after an exceptionally heavy seed year he drove his wagon down to the Wabash bottoms and shoveled it full of nuts and litter. Then going up to his field he spread the nuts from the tail of the cart on the frozen ground in the same way manure is spread. In the spring when the frost was coming out of the ground and the soil was soft, he had his boys take wooden mallets and go out and pound into the soil every nut they could see. It is reported that he has an excellent young grove at the present time.

"This would not be the method advocated in general, however. The best one seems to be the planting of sprouted nuts in the spring, as this gets around the rodent problem, much of the failure to germinate properly and the uncertainty arising from delayed germination.



"FIDDLE-BACK" FIGURE OCCASIONALLY OCCURRING IN WALNUT



MORE MATCHED WALNUT VENEER. THE VARIETY OBTAINABLE IS ENDLESS

"Getting the plantation started is the easiest thing about it. The fact that during the war not a stick of merchantable timber came from a plantation, as far as I can learn, although some of them are as old as 90 years, is sufficient evidence that something is wrong somewhere. By plantations I do not mean trees planted for ornament or in single rows for shade and windbreak purposes, as a very great number of such were cut, but plantations made in solid bodies for the primary purpose of supplying timber.

"The first cause for this state of affairs is the unsuitability of the sites planted. Naturally the farmer has put his plantations where there were no trees, on the uplands, and walnut is less able than many associated hardwoods to stand such conditions and thrive. It is of primary importance that the soil should be rich, well-drained, and moist. It is just such soils that are most valued for agriculture. Toward the East, where the rainfall is more plentiful, walnut becomes less exacting as to soil and in Tennessee, for instance, is seen growing excellently on rather shallow rocky soils of limestone origin—not in any sense poor or infertile, however. The State of Indiana had an illuminating experience on its

State Forest Reserve. Two areas have been planted to walnut on rather poor soil underlaid at about four feet with an impervious shade. One plantation after 14 years shows an average height of 3 to 4 feet, while in the other, a rather better site, some trees are two inches in diameter at breast height after 13 years although many are only about four feet tall. This is in a region of good rainfall and not the prairie section of the State. Another plantation near South Bend is on the sandy soil characteristic of the region about the south end of Lake Michigan and gives no promise.

"Second to the planting on unsuitable sites as an explanation of the poor development of plantations, is lack of care. The spacing is generally too close to be maintained for many years and nearly every stand demands judicious thinning. Farmers are very unwilling to cut out any trees that show any sign of life in the first place, as it looks like just so much stuff of potential value thrown away. Secondly, they look at thinning in a plantation as the mechanical removal of every other row or alternate trees without regard to condition or size. A thinning on the basis of crown classes is a new idea to them. It is imperative to the proper development of the stand, however. It really seems to require rather trained judgment to tell what density to maintain. If the stand gets too open the trees will become the orchard type, if too close there will be an excessively low increment. A close initial spacing and frequent thinnings probably will give rise to the best results in merchantable timber, and a mixed stand is perhaps still better. I can see no likelihood of the average farmer managing either with any degree of success.



"THE KNOT OVER WASHINGTON'S TOMB." AN UNUSUALLY GREAT WALNUT BURL. THE BURL WAS ABOUT 100 YEARS OLD AND FIVE FEET THROUGH WHEN PLACED IN THE NATIONAL MUSEUM RECENTLY. THE TREE WAS PLANTED BY WASHINGTON'S FATHER AND WAS PROBABLY ONE HUNDRED AND FIFTY YEARS OLD WHEN IT DIED IN 1916

"Since, therefore, it demands potentially agricultural soils and careful management to give any sort of decent return, walnut is scarcely adapted to management in solid stands by farmers for the financial return only.

"But on the other hand there is a wide field for useful planting about the farm on bottomland strips unsuited to agriculture on account of flooding, odd-shaped corners, low permanent pastures, etc. In these places the trees may be planted singly, in groups, or rows, with generally wide spacing, the idea being generally to improve the looks and condition of the farm, offer shelter for stock and made every unused corner produce something. Such plantations will not interfere with grazing to any extent or conflict with any more remunerative use of the land. The trees will never yield timber of high technical value, but although the height growth is inferior, diameter growth will be rapid and the tree will actually become a valuable merchantable article and an asset to the farm, and in the aggregate to the whole country."



A MAGNIFICENT WALNUT ABOUT TO BE SAWN INTO LOGS

ANY ONE MAY BECOME A MEMBER OF THE AMERICAN FORESTRY ASSOCIATION

The subscribing membership fee of three dollars covers the cost of the magazine, "American Forestry," which goes to all members every month. Send your application, with remittance to cover, to the American Forestry Association, 1410 H Street, Washington, D. C.

"HALL OF FAME" FOR TREES

Several nominations, and much very interesting data, has been sent to the American Forestry Association by those who are anxious to see that the Liberty Tree gets a place in the Hall of Fame. Mrs. H. W. Burgan has sent a most interesting account and the Peggy Stewart Tea Party Chapter Daughters of the American Revolution have marked the tree which is considered by many to be the oldest living thing in the eastern part of the country.

The tree is on the campus of St. John's College, Annapolis, Maryland. This giant tulip poplar was on that spot before Columbus discovered America, and the sturdy old tree has survived the storms and changes of nearly six hundred years.

It stands a giant among the other trees of the campus. Its trunk measures twenty-seven feet six inches in circumference about two feet from the ground. At one time the life of this tree was very seriously threatened by decay. There was a very large hollow in its trunks. But the decay was arrested in a rather unusual manner. A number of boys thinking they would have some fun, exploded two pounds of powder in the dry rotting hollow of the tree. One might think that this explosion would have injured the tree but instead the fire following the explosion saved it by burning out the decaying portions of the tree. According to a tradition, the treaty with the Susquehannocks was made under this poplar in 1652. In the shade of this tree, the citizens of Annapolis gathered frequently in Colonial times. And in 1824, Lafayette was entertained beneath its branches. It stands on the campus of a college founded in 1694, and named King William's School. Jessie Croft Garrison finds many references to the tree in the old Maryland Gazette and informs us that the Daughters of the American Revolution placed this inscription on the tree:



THE LIBERTY TREE AT ANNAPOLIS

"This tablet placed upon the Liberty Tree by the Peggy Stewart Tea Party Chapter, Daughters of the American Revolution, of Annapolis, Maryland, October 19, 1907, to commemorate the first treaty made here with the Susquehannocks in 1652, and that George Washington in 1791, and General Lafayette in 1824, visited St. John's College. Through the munificence of James T. Woodward, of New York City, this tree, estimated to be over 600 years old, has been preserved from decay."

"HALL OF FAME" FOR TREES

The Whittier Elm is nominated for a place in the Hall of Fame by the Rev. L. M. Powers, of the Universalist Church of Our Father, in Washington, D. C. This famous elm is near the poet's birthplace at Haverhill, Massachusetts. When the place was sold in order that the poet's mother might live near the Quaker Church in Amesbury, the new owner pro-



Photograph by Merryman

THE BEAUTIFUL WHITTIER ELM

posed to cut down the tree. An admirer of the poet then offered to pay a yearly rental for the place including the tree in order to save the elm. The place is now owned by the Whittier Association and the preservation of the beautiful old tree assured.

"HALL OF FAME" FOR TREES

Uniquely named, this old giant is known as the most famous tree on the Mississippi River. At any rate it is the most widely known, according to J. D. Barnes, who nominates it for a place in the Hall of Fame. Mr. Barnes played with "Willie" Cody and other boys beneath the tree seventy years ago. "Willie" afterwards became known to fame as "Buffalo Bill." The tree is known to all river men on the Mississippi because they called it a hotel. When waiting for a job on the river boats the men made it their headquarters, considering it a good enough hotel for anybody, so widespread were its branches and thick its foliage.



"THE GREEN TREE HOTEL" AT LE CLAIRE, IOWA

"HALL OF FAME" FOR TREES

One of the most beautiful trees of America is a giant oak standing in City Park of New Orleans. This great tree, nominated by Miss Viola Overman, bears the name McDonough—a name familiar to every citizen, and to every child of New Orleans, as well as Baltimore.

In the long ago year of 1800, John McDonough went from Baltimore to New Orleans to live. He was young, handsome, gay, generous, and was soon the most popular man of the city. A love-affair. A disappointment. The girl (whose parents had forbidden the marriage) entered



(Courtesy Clarence F. Low) *THE McDONOUGH OAK*

a convent. The lover moved across the river and became a recluse to society. He turned his attention wholly to business. He was now known as McDonough the Miser.

John McDonough died in 1850. Imagine the surprise of the folk of New Orleans when it was learned that this miserly, eccentric man had willed his vast estates jointly to the cities of New Orleans and Baltimore, stipulating that the funds were to be used for educational purposes and asking "as a small favor that the little children shall sometimes come and plant a few flowers above my grave."

Thirty public school buildings have been erected in New Orleans from the funds realized from the management of this estate. In each building is a marble bust of John McDonough. On a certain day each year appropriate exercises are held as a memoriam to this beloved benefactor.

The McDonough Oak is quite old but is still producing acorns and new growth each year. Measurements made a few years ago by Clarence F. Low, an authority on the trees of New Orleans, are: Spread of branches, one hundred and twenty-five feet; girth (four feet from ground), twenty-six feet.

GAME BIRDS AS PETS

BY A. A. ALLEN, CORNELL UNIVERSITY

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

EVERY year in this country several million hunters start out in search of game birds. As often as October reddens the hills and browns the marshes, men in khaki appear with their guns and the annual pilgrimage to the woods and the lake shore begins. The whir of the grouse, the crackling of the pheasants, the bleating of the snipe, and the whistling wings of the waterfowl combine to hypnotize most red-blooded Americans and lure them forth from business and profession for a day or a week's vacation in the great out-doors. The tramp through the woods fragrant with witch hazel, the pull with the oars through the marshes, the simple living while roughing it, and above all, the excitement of matching one's wits against those of the wild folk, furnish that form of recreation that gives new life to the tired business man and causes him to start anew. Year after year the same man goes back to the same place and perhaps hunts the same birds, and each year his experience grows richer, though he often brings back less game. His first years in the woods were spent entirely in the quest to kill and he learned but little except how poorly he could shoot. But as the years have gone by and his respect for wild life has increased, he has often allowed a wise old grouse to rise without firing and may even follow the same bird for hours at a time from the mere enjoyment of watching it and studying its various moods and ways of meeting or avoiding his approach. And finally he has begun to long for their company at other times than during the few hours in which he is hunting them. If he has a few acres of land about his home he likes to make it the home of game birds, and if he is fortunate enough to have a stream or a pond, he longs to see it dotted with his favorite waterfowl.



A CANVASBACK BEING FED BY HAND. THIS IS JUST ONE INDICATION OF THE MANY PLEASURES TO BE HAD FROM RAISING WILD WATERFOWL ON ONE'S OWN POND THEY GRADUALLY LOSE ALMOST ENTIRELY THEIR INNATE FEAR OF MAN.

Long association with them has made them seem like children to him and he enjoys their every mood. It is now not only their quest that fascinates him but their activities throughout the year. He loves to sit on his porch and hear the grouse drumming in the copse near by; he enjoys watching the gorgeous cock pheasant strut across his lawn or the dainty bob-white lead her brood of youngsters through his garden. The whistle of the duck's wings as they circle over his



IT IS A DELIGHT TO SEE ONE'S OWN PHEASANTS STRUTTING WITH GREAT PRIDE ACROSS ONE'S LAWN, AND THEY ARE QUITE EASY TO REAR IN SMALL NUMBERS.



THESE BABY RUFFED GROUSE ARE PARTICULAR PETS OF THE FAMILY, AND THEY CRAVE HUMAN COMPANIONSHIP.

pond is music to his ears and he never tires of watching their courting performances as they float about on its surface. Even if his grounds are limited to a city yard, he may yet enjoy the presence of a pair of dainty teal or of the elegant wood ducks.

During the past few years it has been the writer's good fortune to be able to surround himself with a variety of game birds and though his grounds are limited to about four acres of rough land, a large part of which is occupied by the house and garden, he is able to enjoy the wild life of the woods and the marshes from his windows. On a little pond made by damming a small stream, seven species of wild ducks float about unconcernedly or occasionally disport themselves diving or showing off their plumage to the more demure females. A pair of mallards busy themselves along the shore with a brood of twelve youngsters; a pair of wood ducks go in and out of a nesting box built for them above the water, and a pair of green-winged teal are nosing about a far corner of the enclosure as though they would like to start housekeeping of their own, and one never tires of watching the canvasbacks and redheads and scaup ducks diving for the grain in deep water. There is a low cliff at one side of the pond, where the phœbes nest, with a stone wall along the top where one can sit and look down into the water and follow the movements of the ducks as they nose along the bottom. Their wings are held close against their sides while their great paddle-like feet churn up the water behind them and their bodies seem coated with a silver plating of air bubbles. Not the least of the pleasure which one derives from these waterfowl pets is the tameness which they develop. They swim toward any one approaching the pond and follow him around, and some will even eat from his hand. Of course the majority have the feathers of one wing clipped so that they cannot fly, though in the late summer when they have renewed their quills they often rise from the pond and circle over the trees. Indeed it has always been our custom to let them fly until the approach of the hunting season makes it advisable to curtail their freedom for their own sakes as well as for ours. Last fall, however, one little green-winged teal was not clipped until after the hunting season had been in full swing for over a month. Each morning and evening it rose from the pond and circled over the house directing its flight toward Cayuga Lake or the Inlet Valley abounding with hunters. Each time we held our breath until we again saw its dark form silhouetted against the sky and watched it arch its wings and drop like a leaf over the adjacent trees down once more to the little pond which it recognized as its home.

There is a snow goose that stands like a marble statue



THIS GROUSE, REARED BY THE WRITER, LOVED TO PLAY, DEMANDED HUMAN ATTENTION, AND SHOWED UNUSUAL INTELLIGENCE.



PHEASANTS ARE WILD, UNTAMABLE BIRDS FROM THE TIME THEY ARE HATCHED. COMPARE THE APPEARANCE OF THIS BIRD WITH THE YOUNG GROUSE.

at one side of the pond until the drake mallard notices his proximity to the mallard duck. The mallard has a pugnacious disposition and lowering his head he starts toward the goose, of whose timidity he has already learned. The goose has longer legs than the mallard and can run faster, but the mallard can help himself along by flapping his wings. A comical race ensues, the goose, with his head thrown back and his chest up, strides up the bank with his wings held close to his body. A few feet behind him, with his head lowered close to the ground and his wings desperately fanning the air, comes the mallard drake. Across the yard they go and up the hill through the vineyard where the mallard soon finds himself handicapped and ceases pursuit to stand guard on the path and not allow the goose to return. The snow goose is a gentle bird compared with the Canada geese and makes a better pet for when the Canada geese begin to nest the old gander is almost dangerous to have around, so fierce does he become. One needs to arm himself with a club when he approaches them to hold him off or he may suffer from numerous bruises inflicted by the bony knobs that are borne on the bird's wings. The writer was once taken off his guard while feeding these strenuous pets and felt the effect of a rather severe drubbing for a week after. They are interesting birds, however, especially when they are nesting, for the gander is a most devoted mate. All day long he stands guard by the nest while the goose incubates, accompanying her once or twice a day to the pond to eat and drink. For five weeks he is thus attentive until the eggs hatch and then he is even more proud and more pugnacious in the defense of the youngsters. No matter how versed one is in the ways of the waterfowl he is continually being surprised when he lives with them year in and year out. He learns new things about their habits and calls that he did not know existed: the changes in plumage that are so difficult to study in nature without the killing of a great many birds open up like a book to read as he passes the pond each day. The courting performances that one can observe in nature only at great distances take place within a few feet of his eyes and the varied calls that are ordinarily so confusing explain themselves in a very simple way.



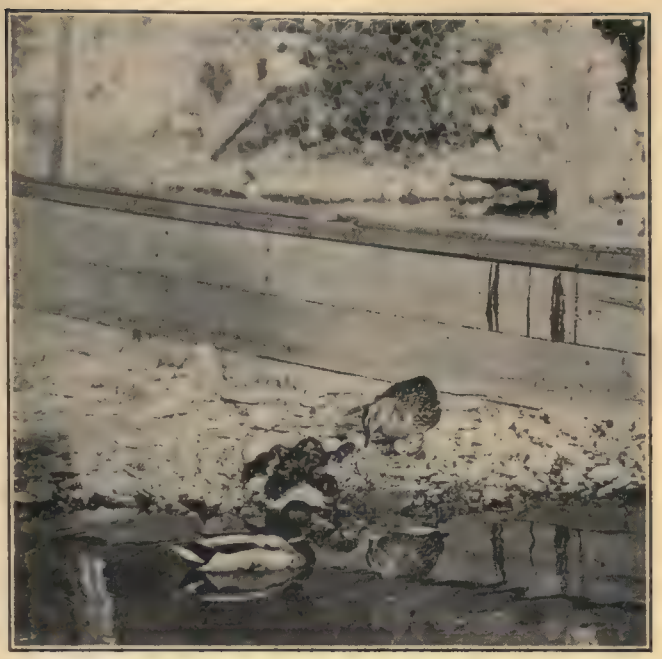
THIS IS A BABY GROUSE. RUFFED GROUSE MAKE GENTLE PETS FROM THE VERY START. THIS LITTLE CHAP IS BUT TWO DAYS OLD.



A CANADA GOOSE IS A STRENUOUS PET, ESPECIALLY WHEN NESTING. THE GANDER IS SHOWING HIS PUGNACIOUS QUALITIES BY BEATING UP THE INTRUDER WITH THE BONY KNOBS ON HIS WINGS.

If one is not blessed with a pond upon which he can keep waterfowl, he can still have an enclosure and keep a few upland game birds. Pheasants are easy to raise on a small scale and one can

obtain the eggs gratis from the Conservation Commissions of many States if he will promise to liberate the birds when they are grown. It is even more interesting to watch the young game birds develop than it is to have the old birds about one. A book like that written by H. K. Job on the propagation of wild birds will give one the principles involved and a little experience is all that is necessary to start one in a modest way into the business of game farming or at least the raising of a few pheasants for his own pleasure. The ring-necked pheasant is the one most commonly and easily raised and is always the one best to begin with because the stock is the least expensive. If one wishes still more showy birds, however, the golden, the silver, the Lady Amherst, and the Reeve's pheasants are nearly as easily managed. Pheasants are, however, nearly always wild, untamable birds and their young are very much like them, lacking entirely the friendly confiding natures of our native bob-whites and grouse. The most lovable of all the young birds with which I have ever had any experience are those of the ruffed grouse. They seem absolutely devoid of fear from the time they are hatched and seem to enjoy being handled for they cuddle into one's hand in a most trusting manner. As they grow older, they seem to crave human companionship and like nothing better than to climb all over one. One young bird that I raised to maturity demanded human attention and, if I neglected to play with him when bringing feed, he would fly at me as though enraged and tug at my trouser leg until I gave him the attention that he wished. Our native grouse and quail are much more difficult to raise in captivity than are the pheasants and one should not plan to experiment with them until after he has learned the rules with pheasants. When he is prepared to do so, however, he has a wonderful storehouse before him with which to enrich his life and make more dear to him than ever the days spent in the woods and fields in search of game.



A FAMILY OF MALLARDS ON THE SHORE OF THE POND. MALLARD DUCKS ARE VERY EASILY RAISED IN CAPTIVITY.



THE SNOW GOOSE MAKES A BETTER PET THAN THE CANADA GOOSE, BECAUSE IT IS A MUCH MORE GENTLE BIRDS.

AN ORCHARD PLANTED IN HONOR OF "CHER AMI"

ONE of the members of the American Forestry Association, who has already generously (and anonymously) arranged for the planting of two memorial orchards in France in honor of two Americans who gave their lives in the war, was touched by the following appeal and has donated a third orchard to be planted in France as a fitting memorial to "Cher Ami," the carrier pigeon:

"Shall we forget 'Cher Ami,' the carrier pigeon, the stout-hearted, swift-winged message bearer that flew through whistling shrapnel and bursting bombs and brought the news from the Argonne Forest to American headquarters of the desperate plight of the Lost Battalion and its famous leader Lt.-Col. Whittlesey? Relief came in response to the appeal found in the container on the pink leg of the battered and exhausted little body that lay where it had fallen in the pigeon loft at the American Army Headquarters in France. 'Cher Ami' was cited by General Pershing for meritorious service and awarded the Distinguished Service Cross. He died from the wounds he received when carrying a message that saved men's lives."

A VOICE

BY LEANDER GOETZ

I am only a voice and there's no one to hear;
The joys of my childhood departed
When the men with the axes and wagons came near
And left me alone broken-hearted.

My brothers and I and my sisters were nine;
We lived on this hillside together;
We whispered the tongue of our great mother, Pine,
And were happy—no matter the weather.

My brothers and sisters were beautiful trees,
The fairest in all the sweet wildwood;
But I am a cripple, as every one sees,
From a blow in my earliest childhood.

I do not lament the big scar that was left
When the wild storm of winter had riven me,
But alas! when I think how I am bereft
Of the playmates the Tree-god had given me!

We often would look at the beautiful sky
The sun and the clouds said, "We love you,"
The stars whispered low, as they softly drew nigh,
"Sleep on; we are watching above you."

The juncos hopped near with the break of the day,
And the chickadees twittered soon after;
The chipmunks and squirrels dashed by in their play
And the crows filled the woods with their laughter.

The fireflies came with their lamps glowing bright,
When the sweet summer twilight was falling,
And the crickets and katydids chirped through the night
And we heard the lone whippoorwill calling.

We never were lonely; we knew naught of care,
No blessing of earth ever missed us;
For were the days stormy, or were the days fair,
The raindrops or sunbeams had kissed us.

My comrades are gone, and it's lonely to be
On this desolate hillside without them,
And the winds from the wood meet the winds from the sea,
And they whisper all night long about them.

For oh! they were snatched from their mother's embrace
When the snowflakes around us were flying,
And their forms that were perfect in beauty and grace,
Were dragged to the market place, dying.

For the worship of Christ they have suffered, I'm told,
For the Christ-Child whose birthday is cherished;
But I know it was more for the worship of gold,
That my brothers, my sisters, all perished.

INSECT SNOW—AN ENEMY OF BEECH TREES

BY R. W. SHUFELDT

INSECT "snow" may be found on many trees, particularly beeches and sycamores, during the month of August. The "snow" is a white down upon the back of little black insects and when thousands of these gather upon a tree and virtually cover it the effect is very much as if a snowstorm had spread its mantle of white over the tree.

The writer first saw this insect snow in August, 1919, and at night. Coming to a big beech tree and turning a flashlight on it to observe whether any moths were lurking under the leaves, the writer saw that the limbs and foliage of all the lower part of the tree looked as though it had been in a snowstorm. Almost immediately afterwards a sycamore tree was found to be in the same condition. The limbs and leaves presented a most remarkable and beautiful sight in the brilliant glare of the flashlights. The pure white, cottony-looking layer covering the ***under sides*** of hundreds of the leaves and the limbs and twigs upon which they grew, was the white down growing on the backs of many thousands of little black insects. A large branch was cut off without jarring any of this curious host of little insects and carried home for study, where it was duly suspended from a string stretched across the room. Upon approaching it next morning it was discovered that when the limb was jarred in any way, all of the hundreds of little creatures on it began to sway to and fro in unison, and this synchronous rocking was kept up several minutes after the disturbance had ceased. The same effect was produced when one clapped one's hands, and at the same time a large number of the insects jetted out a minute drop of watery fluid, the whole coming down as a miniature shower. Later on the writer photographed this limb, and it is reproduced with this article.



INSECT SNOW ON A BEECH TREE LIMB

This peculiar appearance is caused by thousands of small insects which by sucking the sap do great damage to beech and sycamore trees.

Along in 1851, Fitch, the distinguished entomologist of New York State, gave the original description of a very remarkable insect that was discovered in masses, attacking the leaves of beech and sycamore trees of that part of the country. This was followed by published accounts of the same species by other entomologists, but it was not until 1886 that Lintner gave the most complete accounts extant of what is now generally referred to as the "beech blight."

Lintner stated that he had received specimens on the under surface of a leaf of "an insect about one-sixteenth of an inch long, with a tuft-like down attached to the end of its body. It is found in large numbers in the woods, but only on the beech. The limbs are so thickly covered with them, that in their continued swaying motions back and forth they all kept time. Underneath the leaves and on the ground is found a blue or drab-colored substance, undoubtedly the offal from them.

"The insect is one of the Aphides (*Aphididæ*), commonly known as plant lice, having the scientific appellation of *Pemphigus imbricator*. Popularly it is known as the beech tree blight."

The females of these tiny insects are provided with wings, and in both sexes the body is shiny black for the most part, with the legs of a much lighter tint, while a very striking character is to be seen on the hinder half of the abdomen, where there is attached a little tuft of snow-white down, so arranged that it practically puts the rest of the insect out of sight. These aphides congregate in dense masses on the under sides of the leaves of beech and sycamore trees during midsummer.

Doctor Fitch further pointed out that "a peculiar feature of this insect and of its allied species is the white substance in which they are developed, resembling threads of cotton or wool, and which has given them the name of 'woolly aphids.' It appears in the form of threads or fibres which are sometimes long and flattened as in the beech-blight, and sometimes in the form of fine powder.

"The substance is secreted by a glandular organ in the abdomen and thorax, and is of a peculiar character, being insoluble in water, alcohol, or solution of potash, and is not melted by the application of heat. The

purpose which it serves in the economy of the insect is not known."

It has also been ascertained that the allies of this little insect infest other trees, as the apple, elm, oak, pine, hickory, alder, and so on.

These early entomologists made record of many other interesting facts bearing upon the habits, structure, and peculiarities of these strange little insects, much of which is of value to any one interested in the history of the insect enemies of our trees.

The writer just quoted goes on to point out that "of course all the aphides are injurious to the vegetation that they attack, the amount of their harm depending upon their numbers, and the quantity of the sap that, by means of their beaks inserted into the bark, they are able to withdraw from the circulation.

"As the peculiar coating of these woolly aphides protect them from most of the insecticides that could be applied to them in a liquid form—shedding the fluid without absorption—the best remedy for them to be found is crushing them with a cloth, stiff brush, or broom, as they occur in their conspicuous masses upon the trunks and branches."

It has further been shown that "this species is quite resistent to cold, since it was observed the latter part of October, 1903, in New York State, after the temperature had been quite low, and while an inch of snow was to be seen on adjacent hillsides." It is a widely distributed species over the State of New York, and ten or twelve years ago it gave a great deal of trouble in Oneida County, the beech trees being covered with the pest, killing all the branches. The limbs become much twisted and distorted after the insects have sucked nearly all the sap out of them, and it is a curious sight to see a big tree having all of its limbs so thickly covered with these insects that it looks as though it had been dusted over with powdered lime from the topmost twigs to the lowest branches. Thousands of beech trees have been destroyed by this pest, and the menace has become a very serious one to this valuable tree. In other sections the sycamores have suffered to nearly the same extent.

It is an interesting fact, and an important thing for the forester to know, that the insect has a natural enemy in the caterpillar of one of our native butterflies, known as the Harvester (*Feniseca tarquinius*), which has a range all over the Atlantic States and the Valley of the Mississippi. It is a small, bright orange form, its nearest relatives being butterflies occurring in Africa and Asia. One of the entomologists of New York has pointed out that "the mother insect deposits her eggs upon the twigs of beech, alder, etc., in the midst of colonies of woolly aphides. The caterpillars, upon hatching, spin a thin web and devour many of the plant lice, completing their growth within thirteen days."

EUGENE BRUCE DEAD

A DEEP sense of loss is felt throughout the profession in the death of Eugene Sewell Bruce. Mr. Bruce was one of those who earliest believed in forestry, and his vision, coupled with his highly practical knowledge and experience, did much to bring about some of the most important work which has been accomplished in forestry today. He had as well those traits in a strong man which so endear him to his associates, and "Gene" Bruce will be genuinely and widely mourned. The Society of the American Foresters, of which Mr. Bruce was a senior member, in framing resolutions on his death, said in part:

"In the death of Eugene Sewell Bruce, the Foresters have lost a man unique in the history of American forestry, a pioneer builder of forestry in this country, and a wise and practical leader of the profession. . . . He was recognized as one of the most efficient of the practical lumbermen of the north woods, when twenty years ago, he abandoned a career rich in promise as a lumberman in private employ, to join the little band of foresters in Washington.

"His ability to grasp what foresters were thinking about and his intimate knowledge of the difficulties in their path, made his services of inestimable value. He was the necessary connecting link between foresters and lumbermen. He led foresters to understand lumbering and lumbermen to apply forestry. He was quick to grasp the conception of forestry, its place in the ultimate development of our forests and its relation to the practical side of the lumber industry. In those days he was perhaps the one lumberman who saw clearly that the vision held by foresters must soon be realized, and to the realization of this vision he gave the better part of his life. . . . To those of us who are still plodding along the trail, his loss is softened by the knowledge that he lived to see the accomplishment of his aims. He brought his vision down to earth and made it work. . . . He placed public interests above his own personal advantage, and with the zeal of a new convert to a great cause, fought for them courageously without sparing himself in the face of opposition and antagonism. . . . He has left his mark upon the foresters of the country. There is no other like him."

LEAVES

By Leila Brechenser-Rostiser

I wish that I at death might please
To journey as the wearied leaves.

I wish that I might gently go
To sleep, beneath the soft, white snow.

I wish that I might smiling die
And by God's grace as safely lie.

PUTTING TOWNS ON DRESS PARADE

HOW THE MEMORIAL TREE IDEA CAN BE INCORPORATED WITH CITY BEAUTIFUL PLANS THROUGHOUT THE COUNTRY

TOWNS and cities are being made over as the result of the campaign of the American Forestry Association for memorial tree planting and for "Roads of Remembrance." The United States Army has just started another motor transport corps across the country to the Pacific, this time through the South. This caravan will carry the message of good roads into hundreds of towns and to thousands of people. In the almost two years since the signing of the armistice there has come a great awakening in tree planting. From every section of the country the American Forestry Association is getting reports of what is being done. In almost every case where a memorial is under discussion the plans include the planting of memorial trees as the setting for that memorial. There is New Jersey for example. Alfred Gaskill, the state forester, comes forward with the suggestion that a memorial forest park at Kittatinny Mountain be the State's tribute to her heroes. At Hamilton, Ohio, a great plan is under way for making over the city which hitherto has never had anything but her back doors facing the Miami River. Now Hamilton proposes to turn herself around and face the river with a beautiful boulevard in the scheme of which shall be memorial tree planting. In Brooklyn we hear discussion of a memorial boulevard on a most pretentious scale. In Manhattan the memorial idea centers around a great memorial bridge across the Hudson into New Jersey. Here offers a fine opportunity for both sides of the river to plant memorial trees along the approaches to such a structure.



A DEDICATION PARTY

These children participated in the dedication of a memorial tree to the 38 men of White Plains, New York. The tree has been marked and registered with the American Forestry Association by Mrs. Charles C. Webster, of the Nature Study Section of the Contemporary Club of White Plains.

In a statement for American Forestry C. R. Greer, of the Beckett Paper Company, of Hamilton, sets forth the hopes of that city in its plans for a city beautiful. His statement says:

"A series of related river front improvements are in progress in Hamilton, which it is believed, will ultimately give to the city the most distinctive, useful and adorning development to be found in any of the smaller American cities. The present population is above 40,000, but the accession of large industrial concerns assures immediate growth and has encouraged the citizens and public officials to undertake improvements that will make the city worthy of its metropolitan aspirations. The Great Miami River traverses Hamilton from north to south, a distance of nearly four miles. The site of the town is naturally attractive—an extensive level valley, flanked on all sides by wooded hills over which the city is slowly expanding. As in most industrial towns the

ROAD SIDE TREES

Here is an example of editorial co-operation. This editorial was taken from the Macon, Georgia News, which in turn found it in the Atlanta Constitution. The reader will note that it incorporates the view of the Louisville-Courier Journal. Thus does the message of the tree travel.

The movement for planting trees along public highways, as a part of the general development of the good roads scheme is growing in popular favor everywhere; which is encouraging.

A tree is not only a thing of beauty, but is of real value, and from both the standpoint of beauty and intrinsic value, increases rapidly with the years.

As for roadside trees, planted and cared for at public expense, there is every reason for hoping that the present nation-wide movement to that end will eventually attain its objective.

"The time will come," the Louisville Courier-Journal prophesied in a recent editorial, "when every State will plant and protect trees along highways. At present, men are likened to faddists or cranks when they insist that no program or public improvement is complete that does not include trees for public roads.

"Delaware, a State which has come recently to the fore as an improver of roads, will have tree-lined highways, and between the trees, where conditions warrant it, the roads will be bordered with shrubbery."

Sir Walter Scott, in "The Heart of Midlothian," quotes the dying old Highland laird as saying to his son, with almost his last breath:

"Jock, when ye hae naethin' else to do ye may be aye stickin' in a tree; it will be growin', Jock, when ye'er sleepin'."

That was good advice for "Jock," and it is as good today for every citizen who has access to a bit of ground, and it is as good for the nation, the State, the county, the city, the town or the school district as it is for the citizen or even was for "Jock."

And the need for more trees—trees in which are combined the qualities that make them useful in a utilitarian sense as well as ornamental, of which there are hundreds of species—is growing greater every day.—Atlanta Constitution.

river front has been an eyesore. Industries back up to it and in many cases encroached upon the channel. There was hardly a front door on the whole river bank and a strictly utilitarian population for generations regarded the river as a natural dump.

"There was a general awakening of public taste in a large section of the community, and many citizens began to realize that in her river Hamilton had a great, utilized opportunity for civic beauty and recreation. A Park Commission, composed of three leading business men, was named and George E. Kessler, the landscape architect, was called in. Mr. Kessler pronounced the situation ideal for development and his studies eventuated in a comprehensive plan for an encircling boulevard, with levees at some points, and two large parks to be connected by the driveways. It was estimated that under the scale of costs obtaining at that time the whole improvement could be carried out for $400,000, but the development of public taste and civic spirit had not been sufficiently general, and the bond issue was voted down overwhelmingly.

"In March, 1913, Hamilton, in common with other towns of the Miami Valley, was swept by flood. So great was the loss of property and life that the counties of the Valley banded together resolved to make the Valley forever free from the menace. The Miami Conservancy District was organized and a flood prevention project estimated to cost about $23,000,000, was undertaken and is now more than sixty per cent completed. Arthur E. Morgan, of Memphis, whose protective works in the

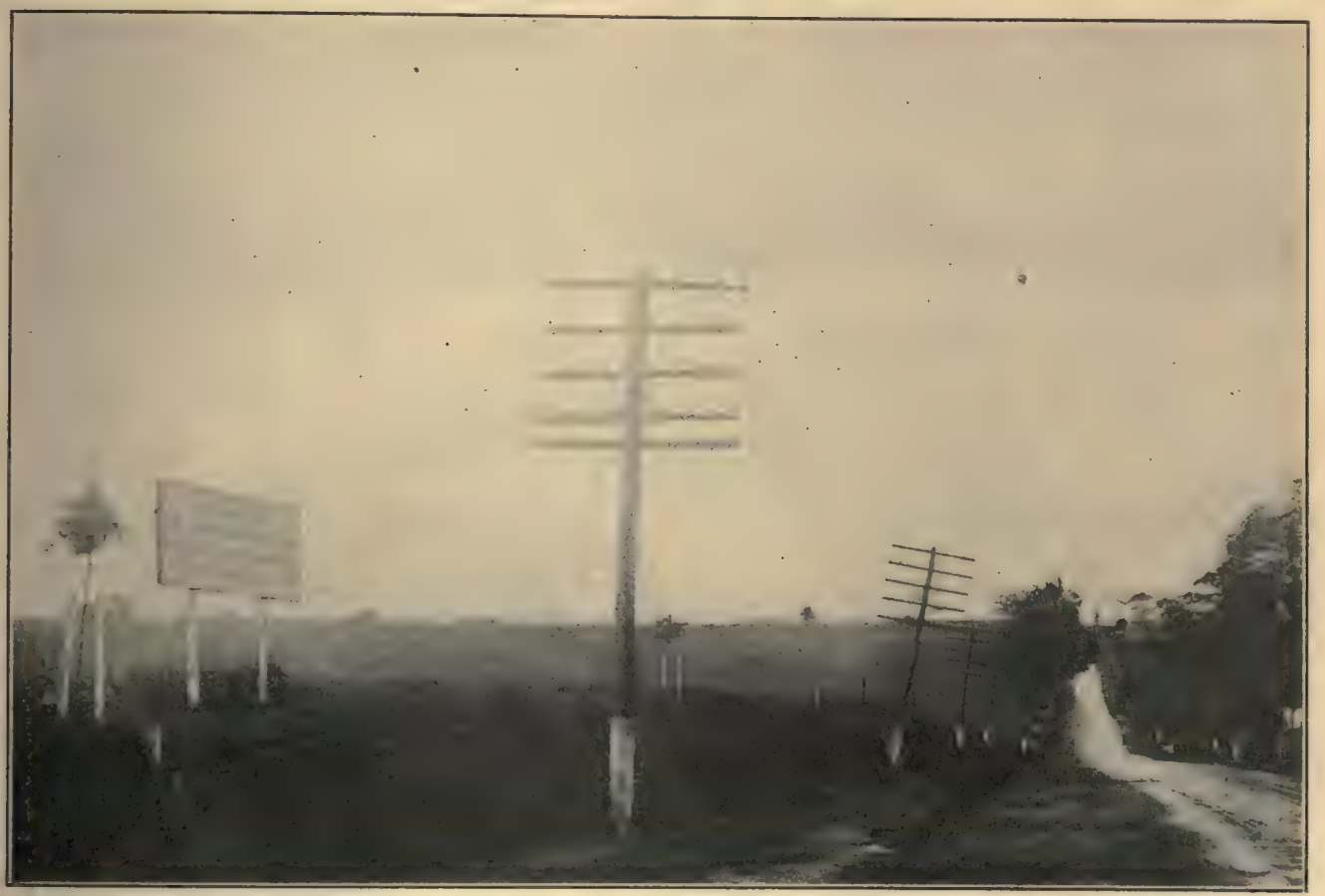


Underwood and Underwood THE ROAD TO THE CROSS

The cross on Mount Rubidoux, near Riverside, California, in memory of Junipera Serra, founder of California missions, has made the way to the top a virtual "Road of Remembrance," showing that such memorials need not be confined to world war heroes.

Mississippi Valley had won him reputation, was made chief engineer and there was gathered about him a group of consultants that included the greatest hydraulic engineering knowledge and experience the world afforded. A series of dams and retarding basins to hold back any surplus of water above channel capacity constitute the chief feature of the program, but at critical points in the cities channel enlargements and improvements were added. It was this part of the program that gave to Hamilton her great chance to redeem her river and to develop a parkway system comparable to that Mr. Kessler had conceived years before.

"Hamilton thus had the unusual experience of having a large nucleus for a complete boulevard and park system handed to her without cost. It is true that the gift is in the rough, but conservancy engineers pledged full cooperation, so that the entire cost to the city would be only the work of embellishment and the acquisition and development of any desired additional lands. Public opinion immediately crystalized in support of Mr. Morgan's suggestion and the city council has authorized the completion of a boulevard from the heart of the city skirting the river front south for a distance of more than two miles. A fifty foot driveway will be established



Photograph by Kraus

A LIBERTY ROW

This Liberty Row has been started at Westminster, Maryland, by the Civic League, the plans being in charge of Mrs. Austin Gallagher. This is an example of how the "Roads of Remembrance" idea of the American Forestry Association is being taken up in all parts of the country. Eight pin oaks have also been dedicated in Mount Vernon Place, Baltimore. The trees in the picture will some day offer a fine example of which is of more value to the road, memorial trees or telegraph poles.

"The Miami Conservancy district is now widening the channel through Hamilton and erecting levees. To accomplish this end the Conservancy Directors were forced to acquire practically all the river front property, and as a consequence buildings that have been eyesores for generations are being razed. The large equipment used in the project has filled many acres of lowlands to the general level and made available for public purposes much ground hitherto useless. Mr. Morgan proposed to the citizens of Hamilton the conversion of the entire levee improvement into a parkway and boulevard. He suggested the acquisition of various tracts of land for park purposes and tendered the services of the Conservancy district in moving all the material required for both drives and park fills.

and money has been appropriated for the purchase of lands for two riverside parks conveniently accessible to the population. At the south end the levee and boulevard will give protection to about 200 acres of lowlands and it is believed that this extensive tract will ultimately be acquired for a large public park. A hardly less important development will be made toward the north. By the joint action of the city, county authorities and the conservancy directors a boulevard will be extended to the north by extending North Third Street across the lowlands of this district on a levee embankment skirting the river. This road, to be known as Riverside Drive, will be five miles in length, crossing the Great Miami River once and connecting the city proper with the big blast furnace and coke district to the north. With these im-

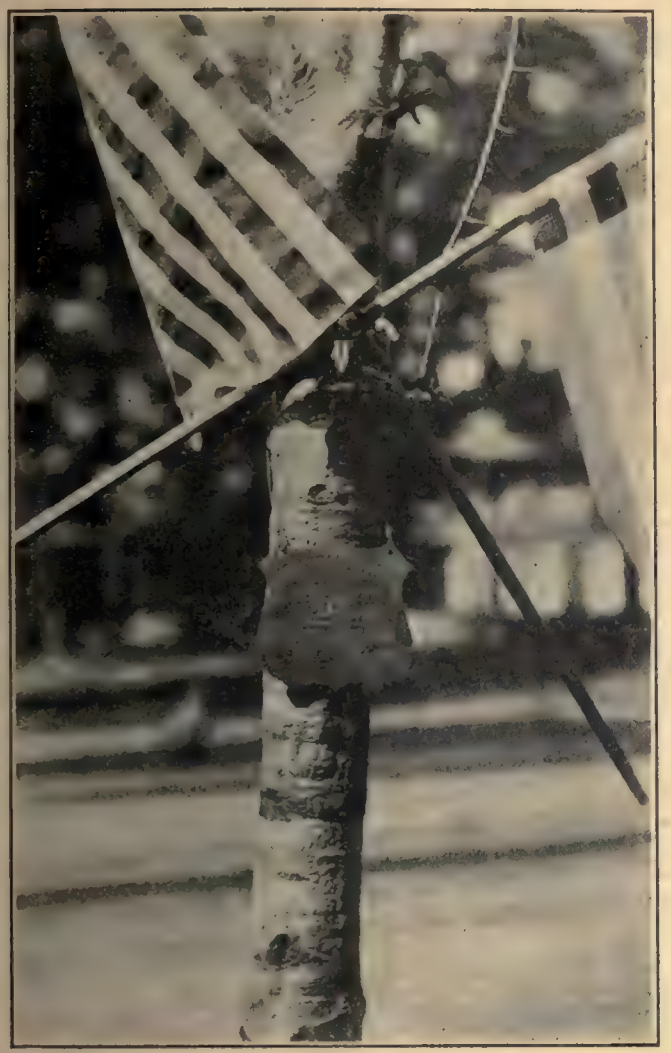


Underwood and Underwood HERE THEY FOUGHT FOR LIBERTY AND DIED

What can be done in the proper placing of memorials in connection with the building of "Roads of Remembrance" as suggested by the American Forestry Association, is well shown. This is the Old North Bridge at Concord, where the patriots of the Revolution fought.

provements completed it is quite probable that the encircling section, skirting the hills to the east of the city and tying the whole system into a great circular highway, will ultimately be carried out, and Hamilton given a parkway system comparable to the best in America. Steps are already under under consideration by civic organizations to provide for the systematic planting of trees along the proposed boulevards, and this essential feature will not be omitted."

In Brooklyn there is a plan for a Memorial Boulevard that links with much of the history that is Brooklyn made. The old King's Highway, over which other soldiers marched at their country's call is to become a memorial to the men who answered a later call. It was over this road the patriots marched to turn the tide in the Battle of Long Island. It was on King's Highway that the sons of Brooklyn marched to assemble for the call of duty in every struggle in which America was a contender from the War of the Revolution to the late World War. Many of those who answered the last call were direct descendants of those who took part in the first strategic war move enacted by the Colonial troops on the grounds traversed by King's Highway. They treated the British troops, under the command of Lord Cornwallis, to a military surprise by evacuating an encampment in the New Lots area in the dead of the night



ONE OF THE AMERICAN LEGION MEMORIAL TREES

The American Legion at Tuscaloosa, Alabama, marked their memorial trees with the markers designed by the American Forestry Association and registered on its honor roll by Fred R. Maxwell, Jr. The planting was done on an avenue connecting the University with the city and the trees have several fraternity houses for background. On the program, co-operating with the American Legion Post were the members of the Confederate Veterans, Spanish-American War Veterans and the World War Veterans, as well as the United Daughters of the Confederacy Among the speakers were: Rev. C. M. Boyd, Col. Woolsey Finnell, Prof. George Lang, Mrs. C. N. Maxwell, Mrs. Alston Maxwell, Mrs. James F. Alston, Irving Dugins, Zack Dowling, W. W. Brandon, Reuben Wright, George Drolet, Rev. G. W. Greep.

and leaving behind their empty tents, so as to take up an important position on the plains of East New York a few days prior to the Battle of Long Island.

The length of the proposed Memorial Boulevard will be slightly over six miles. It will extend from Bay Parkway to Eastern Parkway. It will follow the line of King's Highway from Eastern Parkway to Avenue P, at which point Avenue P will be followed to Bay Parkway. For the distance of King's Highway the new boulevard will be 140 feet wide, and from Ocean Parkway to Bay Parkway it will have a width of 100 feet. Where the width is to be 140 feet it is proposed to lay out a park area in the centre. The length will be properly treated and planted on both sides with shade trees and shrubbery, making it one of the first boulevards from a landscape feature in this part of the country. The boulevard will be dotted with beauty spots, and, at certain points along the route, or where other principal thoroughfares intersect, forming street groups of plazas, especial treatment will be given, both for beautifying the space and at the same time providing suitable sites for monuments which from time to time may seem desirable.

The tract in New Jersey urged by Forester Gaskill as a memorial park is in the most beautiful part of the State, extending from the Delaware Water Gap for thirty-six miles along the crest and slopes of Kittatinny Mountain to the New York State line, including the highest point in the State, over 1,800 feet above sea level. This wild and forested section, with its magnificent vistas, winding paths and well stocked trout streams, lacks none of the charm of the famous mountain resorts in other States. A wealth of lakes and ponds, and the Delaware Valley add to the attractiveness of the region. There are hundreds of ideal camp sites available for either transient or more permanent use. Good roads reach this section from the east and south, the State highway to Dingman's Ferry cuts it near its center, and brings any part within three hours by motor from Jersey City and Newark, or four hours from Trenton. Numerous stations on four railroads give easy access all up and down the ridge on its eastern side. When the Delaware River drive is completed, the park will be the natural terminus of that magnificent highway leading to the crowning scenic feature of the State, dedicated and developed to the memory of New Jersey's part in the nation's crowning achievement.

But while the bigger plans are in the making the individual has not waited, neither has the patriotic organization delayed. Trees are being planted everywhere in honor of the men of war. Those men of war carried the message of freedom and now the trees will carry the message of the men on through the coming generations, for the trees will mark the remaking of the cities just those men marked the remaking of the world.



A PLANTING IN MEMORY OF FIVE BOYS

On the brow of a hill on the Tug Fork Road near Melbourne, Kentucky, stand five memorial trees. These trees were planted by Ray Layfield, William Rehg, Harry Yung, Gus Yung and Ed. Glahn, the five young men from the little community who aswered their country's call when the call came. The trees are on the grounds of St. John's Lutheran Church, of which the Rev. J. Frederick is the pastor, and he delivered the tree day address at the planting ceremony.

300,000 TREES PLANTED IN NEW YORK

FIFTEEN miles northeast of the village of Lacona, New York, farms once prosperous are going back into forest land, because they are not sufficiently fertile to warrant cultivation for food crops in these days of intensive cultivation of the soil. These farms were near the location of an old saw mill, on the old high road, built in the war of 1812, for the carrying of a cable on an air line across the country from Rome, New York, to Sacketts Harbor, for Perry's ships. Now the country is reverting to forest, and the work is being handled on a big scale by the Blount Lumber Company of Lacona, which has planted 500,000 trees in this region, in co-operation with the New York State College of Forestry at Syracuse, which each year sends out its freshmen for practical tree planting experience.

The Lacona plantation this year was a task in which 35,000 trees were planted in a week by a party of twenty-one freshmen from the Forestry College, many of the trees being pine, but many also being spruce, for the building up of a new spruce forest for the paper industry's consumption in years to come.

The freshmen in addition to the commissary staff, were organized in three groups of seven each, and one of these seven was elected each day, as leader for the day. The other six were divided into mattock men and setters, and the work proceeded at such a rate that over 1,000 trees were averaged by each pair of workers.



MAKING THE BARREN LAND WORK

Freshmen at the New York State College of Forestry at Syracuse learn practical tree planting by real reforestation work at Lacona, New York.

The Lacona planting, however, was not the only such planting. At Cooperstown, the Forest of the Dozen Dads, a story unique in forestry activities, was planted by another group of planters. There a dozen fathers—for the company requires that each member be the father of a child of under 10 years, planted an abandoned farm, and will turn it back to forest land, the growth from which will provide an investment or endowment insurance for these children when they reach maturity.

Other big plantings have been taken up this year by the College of Forestry, an interesting compilation being the following record of planting done or consulted upon the past spring by the New York State College of Forestry alone. In addition to this work the State Conservation Commission planted literally millions of trees upon state land, but the State Forestry College has been working upon the belief that the private owners must be converted to a policy of reforesting their idle land also. This table of plantings follows:

Malone public forest, owned by the city	45,000	trees
Streeter Lake (paper mill company)	60,000	"
State Ranger School, Wanakena	50,000	"
Watertown Public Schools	10,000	"
Otsego County (14 separate tracts, including Dozen Dads)	48,000	"
Lacona	35,000	"
Syracuse City (college land)	18,000	"
Newburgh Public Schools	5,000	"
Herkimer County (small separate plantings)	20,000	"
Total	291,000	trees

NEW ENGLAND FORESTRY CONFERENCE

AT New London village, overlooking Sunapee Lake, New Hampshire, August 24 to 26, an important meeting of foresters, lumbermen and papermen and their guests will be held. The meeting is under the auspices of the Society for the Protection of New Hampshire Forests and is being organized and directed by Philip W. Ayres, Forester for that Society. Among the speakers are Charles Lathrop Pack, President of the American Forestry Association, who will make an address on the national forest policy at the first evening session; George W. Sisson, Jr., President of the American Paper and Pulp Association; R. S. Kellogg, Secretary of the National News Print Service Bureau; Ellwood Wilson, President of the Canadian Society of Forest Engineers, and several others from Canada who will cover fully and frankly the Canadian situation; E. A. Sherman, Associate United States Forester; Prof. J. W. Toumey, Director of the Yale Forest School; W. R. Brown, of the Berlin Mills Company, and Hugh P. Baker, Secretary of the American Paper and Pulp Association.

TRAMPS THROUGH THE GULF STATES—I

BY R. W. SHUFELDT, M. D.

(PHOTOGRAPHS FROM LIFE BY THE AUTHOR)

HAVING traveled through all the Gulf tier of States, resided in southern Louisiana for over a year, and landed on the majority of the chain of islands on the southern coast of Florida, it becomes a pleasure for the writer to point out a few of the remarkable differences to be noted in the animal and plant forms in that part of our country, as compared with what there is to be found in a similar way throughout



THE COMMON MUSK TURTLE

Figure 1. Throughout the lakes, ponds and rivers of some parts of Texas, we meet with many species of turtles and terrapins; the one here shown is a very abundant form. In the southern portion of its range, the common Musk Turtle occurs in the waters of northeastern Texas; it is so named from the remarkable musky odor it emits when irritated. Few of our turtles are more strictly aquatic than this species.

certain regions composing the northern and middle States.

Unless one has tramped along the Texan banks of the Rio Grande; spent weeks in the jungles of Louisiana; collected natural history specimens in Alabama and Mississippi, and waded in the swamp-lands of the lower half of the Floridian peninsula, it is difficult to appreciate the enormous stretch of typical, subtropical country we have at our very doors for exploration in which to collect material for study. As this region is passed into, what one observes first of all is the gradual disappearance of mountains and hills; and further southward, no elevated land whatever is to be seen. Great swamps and lagoons occur, and big, more or less sluggish rivers, which empty into the Gulf of Mexico. In many places these are all lined with various subtropical trees, from the limbs and branches of which hang somber, gray masses of 'Spanish Beard," that gracefully sway to and fro in the breezes.

There are many kinds of trees that are quite new to the visitor, not to mention the wonderful array of strange plants, many bearing flowers, which, for beauty and form, are totally unlike anything in the north. Over these, in likely places, may flit gay butterflies that you only know from having studied them in text-books or seen them in collections. That big, white and black fellow there, hovering over the dainty orchid swinging from the pecan branch, is surely a Pearly Malachite, which not only is a rare form thus far found only in some parts of Florida and southwestern Texas, but we know absolutely nothing of its early stages—at least we did not up till 1890. Before the day is out you will see, too, many other butterflies that you never saw on any of your outings through New England or any of our



A YOUNG GREEN HERON

Figure 2. This is a quaint looking little fellow about the time it leaves the nest to look out for itself in the world. This species, burdened with many vernacular names, does not breed in heronries, but usually nests in a tree, far from its own kind. They breed all through the Gulf States, and, in many places, rear their broods in comparative safety, which is more than can be said of their fate in thickly populated areas.

northern States; and this is equally true of what you will discover, during evenings, in the way of moths and various nocturnal insects. Very well does the writer remember when scouting, many years ago, through the lowlands of southern Alabama, and he stooped to get a drink from a clear, little spring in the shades of the

forest. Upon noticing some small fish and crays in it, it occurred to him to capture a few specimens of them for future study. A year or so afterwards, these were referred to naturalist friends—specialists in those lines—and both the fish and the cray were found to be species entirely new to science. Thus it goes! And to the observing naturalist, scouting through this part of the country, there is no telling what new creatures he may meet with anywhere in the circlet of States bordering on the Gulf of Mexico. Further, there are numerous animals in that region of which we know a great deal with respect to their habits and their anatomy; while on the other hand, in the case of some others, that knowledge is not as full as it might be, or as we would like it to be.

As to birds, there will probably be no surprises with respect to discovering new species in our Gulf States; although, in the future, some new subspecies may be taken, and such information as we now possess of the habits of those at present known may be augmented in the cases of some of the rarer forms. Especially does this apply to the breeding habits of the resident and migratory species; to the nature of their food, and to the dates of arrivals and departures during the vernal and autumnal migrations.

Perfect as all this may be, our knowledge of the anatomy and physiology of not a few of our feathered forms is very limited, and an excellent example illustrating this point has come up recently. It refers to the matter of the senses of sight and smell in our common Turkey Vulture or Turkey Buzzard. (Figs. 4 and 5.) For a long time it remained a moot question as to how this great, black bird sustained itself in flight without any apparent flapping or other movement of its wings. In the sections of the country where it occurs, nearly everybody is familiar with the fellow, and have noticed that, at certain times, it sails around in great circles above the earth without the slightest wing-movement whatever. During such times it has been studied with the greatest care through high-power glasses, and not a joint or a feather of its wings is seen to move. The bird simply circles about at its pleasure as immovable as though made of wood. It is said that physicists and some aeronauts have solved this problem scientificially. However, that is not the question to be touched upon here, but one that most people believe had been solved long ago, which has now come up again as not having been elucidated to the entire satisfaction of all practical ornithologists and others. This matter refers to the question as to how the Turkey Vulture discovers the dead animals upon which it feeds—whether by the sense of sight or smell. Audubon, who had a way of enlarging on many facts that were known—by no means always truthfully—still further complicated this question when he stated that 'in the Floridas, I have, when shooting, been followed by some of them, to watch the spot where I might deposit my game, which, if not carefully covered, they [the Turkey Vultures] would devour." How the vultures came to know that Audubon was out after game on such occasions, or how successful he might be, or whether he had any ammunition with him, together with other essentials points for them to know, in that they might not waste their valuable time following him about, is not explained by the great bird man. In fact Audubon says nothing further on this point though in one of the octavo editions of his work some editor touches upon it in a footnote. However all this may be, Audubon evidently believed that Turkey Vultures discovered their prey—or the carcasses upon which they feed—through the sense of sight; it must have been through their wonderful *insight* that they followed him about when they saw he carried a gun. Alexander Wilson, however, states that "their sense of smelling is astonishingly exquisite, and they never fail to discover carrion, even when at a distance of several miles from it." This is a pretty good story, too; it is quite a question whether any living animal possesses so powerful a sense of smell as to be able to detect the presence of a dead horse or cow three or four —even more—miles away. At any rate, it would seem that the question has again been raised, and that steps



THE YOUNG OF THE BARRED OWL

Figure 3. This is a most remarkable looking little fellow, more like some puff-ball than a bird. The writer had him alive until he presented him to the Washington "Zoo." This downy plumage of young owls is still in evidence some time after the true feathers begin to appear; so when the bird is somewhat older than the one here figured, its appearance is truly remarkable.

are to be taken, by some doubting Thomases among our ornithologists, to settle, through various experiments, this interesting point for all times. In times long gone by, some ingenious tests were made to solve this problem, but for the lack of space they cannot well be touched upon in the present connection.

As will be noted from an examination of Figure 5, the young of the Turkey Vulture or Buzzard has a downy, white plumage, which it loses at the first moult, when the black plumage of the adult appears. In your excursions through the woods of the Gulf States, you will find, at certain seasons of the year, the Turkey Vultures breeding; but you must not confuse the bird with the other vultures found in that part of the country, namely, the Black Vulture or "Carrion Crow" (not our common crow)—a very different species. The Turkey Buzzard generally lays two eggs, depositing them on the bare ground in the forest, most often at the foot of some big tree, or, occasionally, close to the trunk of some fallen tree or log. As will be seen in Figure 4, they are very beautiful objects, being of a buffy or greenish white, blotched and spotted with gray, or purplish gray and various shades of dark brown and umber. For the purpose of photography, the specimen here figured was kindly loaned the writer by Mr. Edward J. Court, of Washington, while Mr. William Palmer, of the United States National Museum, furnished the living specimen of the young bird. (Fig. 5). Some twenty-eight or thirty years ago, the writer's youngest son slightly wounded an old bird of this species, and from that specimen the portrait shown in Figure 4 was obtained. In so far as man's interests are concerned, Turkey Buzzards are quite harmless, as they never prey upon living animals, such as lambs and young calves. Indeed, they are extremely useful as scavengers; and, in those parts of the country where they are numerous—which is the case anywhere south of New Jersey—they will, with marked rapidity, consume the flesh of a dead animal as large as a horse, if left where they can reach it. The Black Vulture of the South possesses the same habits, and the species is even more numerous.



THE TURKEY VULTURE AND ITS EGG

Figure 4. There are three species of vultures found in the bird fauna of the United States. This is the turkey vulture—a bird widely distributed over the country. The skin of the head is red, and this, taken in connection with the general form of the upper body, is responsible for the naming of this rapacious individual after our domestic turkey.

Should you start your exploratory trip in southern Florida and work your way in the direction of Texas, you may have occasion to observe some of the vandalism now being done by tourists and recent settlers in that part of the State. This is especially noticeable since the roads have been completed, in that automobiles may pass in many directions through the Everglades and elsewhere. Adults as well as boys carry 22 calibre rifles of great efficiency and plenty of ammunition, and as they pass through the country, birds and mammals of every size and kind are shot at and killed in the most wanton manner imaginable. Not satisfied with such destruction, masses of flowers are ruthlessly gathered—frequently roots and all—only to be thrown out of the cars as they begin to wither in the sun. Such practices have now been in vogue for some time, and as a consequence, many of our most interesting and beautiful Floridian species of birds have been reduced in numbers to the very point of extinction, while no end of lovely flowers, that formerly were abundant along the roadsides, are at this time more than rare, or even, in

some cases, gone entirely. You should do all in your power to prevent these practices by helping to enforce such laws as the State has enacted to punish marauders and vandals of this class by giving their names to the proper authorities, whenever they can be ascertained, in



THE PURE WHITE PLUMAGE DOWN OF THE YOUNG OF THE TURKEY VULTURE

Figure 5. The first plumage of the young of many birds consists of a pure white fluffy down. This young turkey buzzard, photographed from life, is a fine specimen. At this stage of development the head and large wing feathers are black.

that the culprits may receive their due deserts. Of all the States in the Union, Florida perhaps stands first in offering the most to the nature lover, naturalist, and explorer; and it is terrible to think of the destruction now going on there by the incoming settlers in the way of floral and animal extermination. We meet with many

mammals, birds, reptiles, and fishes in Florida, species of the most interesting kind and found nowhere else in the world, and we all know how rich and varied her flora is. Hundreds of different forms of fishes; mollusks with lovely shells; crustaceans, and other marine types, may be secured and studied all along her miles of coast line. There are many kinds of turtles and land tortoises to be considered, while the observer also has at hand alligators and crocodiles, the breeding habits of which are interesting; the marine turtles, and, occasionally, a manatee may be seen, where the animal exterminators

have not been at work. Snakes of many forms and rich colors are numerous in some localities; but these are, as a rule, only taken by the out-and-out naturalist, or destroyed by the thoughtless traveler, who rarely realizes how useful and beneficial some of the species are.

Leaving Florida and passing westward, the explorer will find that some parts of Alabama, Mississippi, and Louisiana are less known than the so-called wilds of the western territories. This is especially true of the lower forms of animal life rather than of birds and mammals; while southern Louisiana is distinctly subtropical in these respects, as is her plant-life, the country is nowhere pronouncedly so, as one finds it to be on the southern part of the Floridian peninsula.



THE BARRED OWL

Figure 6. All through the lowlands of southern Louisiana we meet with numbers of barred owls, of which this one is a subadult in its first plumage. They are very numerous in extensive swamps, where their favorite food may be obtained in plenty.

Along the Mississippi, and everywhere in the boundless marshes and swamps, grow hundreds of fine cypress trees, pecans, and palmettoes, and in such places the writer collected for many months, aided by a number of French river-hands, who were wholly familiar with the country, and thoroughly immune with respect to the dangerous malarial attacks which the unacclimatized person is subject to in a country of that character. In summer the heat is often intense, while extreme humidity prevails, rendering thorough exploration in the miry swamps and endless bayous very enervating. In the first named localities one often finds the undergrowth and the palmettoes casting so dense a shade that the sunlight is nearly entirely shut out. Everywhere big, fallen trees and great logs, slippery with a peculiar kind of moss, impede one's progress; and in the dense shadows, with the water from knee to waist deep, the explorer must constantly be on his guard against the many highly venomous snakes that lie on top of logs and lurk in places where their forms and deep brown color cause them to closely resemble the gnarled roots of trees, which one must ever and anon seize in order to prevent a fall caused by the uncertainty of one's footing beneath the moss-covered surface of the water. In the less frequented regions, as among the lakes and bayous of the southeastern part of the State, the animal life is most interesting, and particularly does this apply to the great number of different species of fish one is able to capture and study. With the assistance of his collectors, the writer obtained many of these, together with various snakes and insects, for the Smithsonian Institution and other museums. In those days, Dr. S. Weir Mitchell was conducting, in Philadelphia, his experiments on various animal venoms—particularly the salivas of the moccasins, rattlers, and the unnecessarily dreaded "Gila Monster" of the southwest. To the laboratories of that eminent authority the writer shipped, in a great, double cage, thirteen immense water moccasins, and the curiosity and excitement they caused at the railway stations and other stoppages en route has never been forgotten. Still, Louisiana is a most fascinating State for the naturalist to explore at all times, and for-

esters meet with many problems to solve as they roam through its timbered areas, or study its rich, unusual forests.

Passing into the state of Texas, it is well to remember something of its relative size; what one may expect to find in its flora and fauna, and the nature of its general physical topography. Texas constitutes about one-eleventh of the entire area of the United States—that is, it has an extent of some 262,290 square miles, being more than fifteen times the size of the Kingdom of Denmark, and containing more square miles by over 20,000 than the whole of Austria-Hungary. In describing its general physical geography, an authority at hand says that "the surface features are exceedingly varied, the prevailing elements being steppes, or treeless plains, in the northwest, mountains west of the Pecos River, forests in the east, marshes adjacent to the coast, low prairies in the southeast, and a combination of prairies and broken hills, interspersed with forest growth and thickets of tall shrubs (chaparral), in the centre." Apart from the central region, these various characters are the extensions, inward, of the physical characters of any partciular bounding state. The same may be said of its flora and fauna, both being peculiar to it centrally, while along its southern boundaries they are more or less like that of northern Mexico, western Louisiana eastwardly, eastern New Mexico westwardly, and like the southern parts of the states bounding it on the north, northwardly.

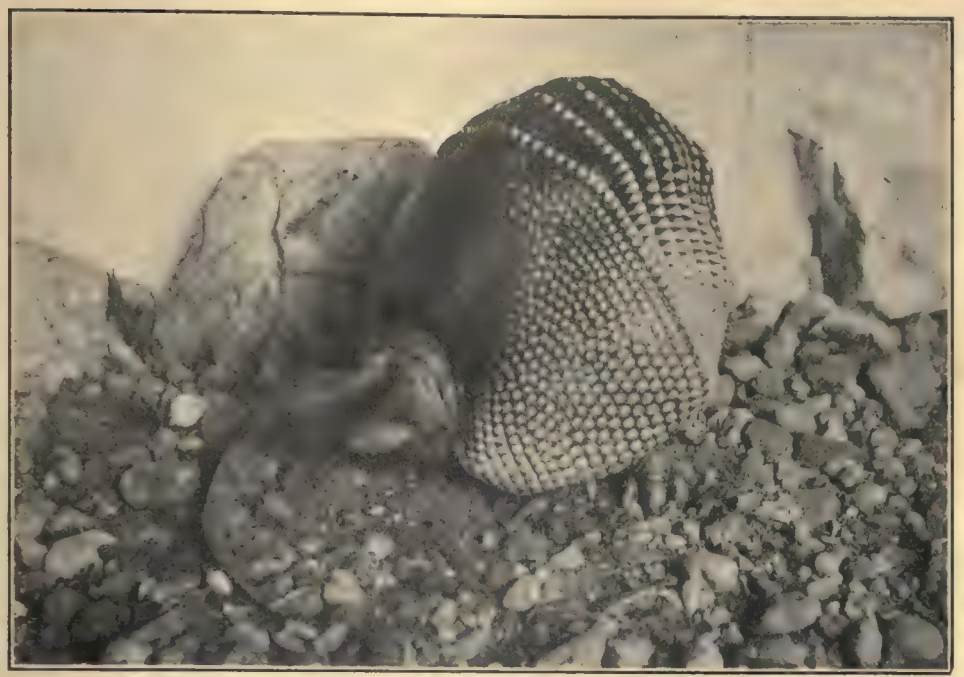


ON THE DEFENSIVE

Figure 7. This is the same chap shown in Figure 6, only there he was peacefully sleeping, and here he has been awakened and is on the defensive—ready to take up for his rights, or to be most peaceable if one keeps a friendly distance.

In different parts of Texas we meet with several species of deer, and a few of the former millions of buffalo are still left. Along the valley of the Rio Grande one may still meet with the mountain lion, the ocelot, and the fierce jaguar. Peccaries and armadillos are also found there; while the prongbuck, wild horse, wolves, and coyotes are rapidly being exterminated. There are many small mammals, as "prairie dogs," mice, rats, squirrels, gophers, and other rodents, as well as shrews, racoons, and opossums. It has a rich bird fauna, including such species as the road-runner, the scissor-tail flycatcher, peculiar birds of prey, and a long list of water fowl, waders, and passeres, while stragglers from northern Mexico frequently come across the Rio Grande. Texas is justly celebrated for its rich and varied flora; but of this more

will be said in the second part of this article next month.



THE AMERICAN ARMADILLO ALMOST COMPLETELY ROLLED UP

Figure 8. The armadillo uses this method of protecting himself from attack, by rolling closely into his own bony coat-of-mail. He was nearly through the rolling process when the photograph was taken.

One of its most remarkable mammals is the Nine-banded Armadillo (Figs. 8 and 9), and the writer had a pair of these alive for some time which had been captured in the southern part of the State. Including the tail, one of them had a length of some thirty inches, and its appearance is well shown in Figure 9. Its armor includes nine movable, transverse bands crossing the middle of the back—an arrangement that admits of the animal's partly rolling itself up into a ball for protection against its enemies (Fig. 8). In all existing armadillos the lower parts of the body are not protected by any armor at all, the skin usually being soft and supporting a growth of long hair. There are numerous species of these animals, with markedly different external and internal characters; they range from Texas to southern Brazil or further. Several of the extinct species were as big as a rhinoceros, and the remains of such are still to be found in the bone caves of central South America; indeed, a goodly volume might be written about these curious mammals and their extinct ancestors.

Our nine-banded species possesses wonderful strength for its size, and when teased may bite one severely. Its gait is quite deliberate; but when it undertakes to run,



THE NINE-BANDED ARMADILLO

Figure 9. Without doubt the most curious mammal we have in this country is the nine-banded armadillo, which inhabits certain parts of the State of Texas. The photograph was taken from life by the author.

it gets over ordinary ground with rapidity. Then, too, if pushed it will start to burrow, and it is truly marvelous to note how rapidly it can make such an excavation in favorable ground. Should the fellow get well started before you overtake it, it requires a tremendous pull by the tail to get it out—it keeping up a plaintive squeaking all the time; it will almost allow its tail to be pulled off before relinquishing its hold. It is very fond of ants, but will also eat certain vegetables and even carrion, if hard up for food.

Down in Nicaragua they keep this animal as a pet, for the practical use of ridding their houses of ants; not infrequently they have even bred in captivity, producing three or four very cute little young ones to the litter. In color, our armadillo is of a pale gray, the hair grayish buff, sometimes tipped with blackish. When captured, it is often caked with hardened mud, which evidently stuck to its bony buckler while burrowing where the soil was wet.

UNWRITTEN HISTORY

BY DONALD BRUCE

THIRTY-SIX years ago, a telegraph bracket and insulator was nailed to a Douglas fir tree near Arcata, California. A few years later a falling branch badly damaged it and the wire which it had been supporting



TELEGRAPH INSULATOR
Glass insulator—wooden bracket and iron nails uncovered in sawing a Douglas fir stave bolt.

was removed. The tree was growing thriftily, adding every summer to its diameter a new layer of woody material and this growth gradually pushed out around the bracket on all sides leaving it burried in the tree trunk. At the end of 26 years (or 10 years ago) the tip of the glass insulator finally disappeared from sight and the only trace of it that could still be seen was a scarcely noticeable lump which looked like nothing more than a healed-over branch stub. A few weeks ago the tree was felled and the wood manufactured into barrel staves. The screech of the saw which happened to graze the edge of the glass called attention to this unusual "fossil."

On spliting open the stave bolt the whole story became clear in all its details, as is shown by the accompaning illustration. The clearly defined annual rings of the rapidly growing tree form an unimpeachable historical record. The wood of the insulator bracket is still in good condition, and the oak of which it was made has received an unintentional preservative treatment, being thoroughly impregnated with the resin of the surrounding fir. The interesting specimen can now be seen in the wood collection of the Forestry Division at the University of California.

ONLY A SAPLING

IN 1902, a tract of long leaf pine timber was cut at Urania. A small sapling about 10 inches in diameter was left standing, which, with other suppressed trees commenced to grow rapidly. Year after year this tree bore seed, which as they ripened were scattered by the winds and soon four or five acres were reforested with a fine growth of seedlings, some almost as large now as the parent tree at the time the forest was denuded. An occasional fire would sweep over the forest, leaving a scar which would soon heal. Hogs exacted their toll and other enemies were constantly at work, but today there is a full stand of 500 to 1,000 seedlings and saplings to the acre, and regeneration is complete. In May, 1920, Professors Chapman and Bryant, with a class of thirteen students from Yale University were at Urania pursuing a course of study in forestry, and in studying tree growth, decided to cut this seed tree, for that is just what it was, in order to make careful measurements and to cut sample sections therefrom to prove to the careless that forests could be grown profitably and that seed trees must be left on denuded lands if our forests are to be perpetuated. "Only a Sapling," has performed its mission—a young forest is growing.

MAKING JAPANESE MINIATURE GARDENS

THE miniature garden industry in Japan has been transplanted to the United States. For several centuries the leading landscape gardeners of Japan have made miniature models of their work so their customers might see how the proposed gardens would look; very much in the same way an American architect will make a prospective drawing of a house, except in this case the garden is made perfect in every detail, except that it is in miniature.



Publishers' Photo Service.

AN EXCELLENT EXAMPLE OF A MINIATURE GARDEN

This little garden is built to represent one of the quaint little villages of Japan.

The care and degree of exactness put into these gardens is remarkable. Great care is used to select exactly the right kind of stones, sand and pebbles to use in each part of the design. Trees are even dwarfed and stunted through many years of careful watching in order that they may add to the completeness of the picture.

These miniature gardens are called in Japanese, "Hako Niwa," meaning dish gardens, because they are usually built in large earthenware bowls. Every Japanese garden contains a stream or lake with one or more bridges spanning from shore to shore. If a natural body of water does not exist, the landscape gardener simply goes ahead and makes it.

For a number of years an annual contest or exhibit of these toy gardens has been held in the city of Kioto, at which the leading landscape gardeners of Japan exhibit their work. A great demand has grown up among the tourists who visit the land of the cherry blossom for copies of these miniature gardens to take back with them to America.

In response to this growing trade demand, one of the large Japanese nurseries has opened a branch near New York City, where one of their expert garden designers devotes his entire time in constructing miniature gardens for the American public. These gardens may be properly divided into two classes. The first, which represents a Japanese garden or familiar landscape in which the landscape and the house are the principal feature, and the dwarf trees are only secondary; and the other type in which a very old dwarf tree is made the central feature, with a few stones and moss-covered rocks at its base to give an impression of its native heath.



Publishers' Photo Service.

REPRESENTING A TWISTED CEDAR OF JAPAN

This miniature cedar is exactly similar to those seen frequently on the mountain sides of Japan. This tree is actually twenty-two years old.

"There is no rhyme that is half as sweet
As the song of the wind in the rippling wheat.
There is no meter that's half so fine
As the lilt of the brook under rock and vine,
And the loveliest lyric I ever heard
Was the wild-wood strain of a forest bird."

—Cawein.

CALL FOR ACTION SAYS FOREST

THE editors of the country continue their co-operation with the American Forestry Association in its call for action on a national forest policy and for better fire protection. *The Olympian* of Olympia, Washington, declares that a "forest fire is a war on prosperity," while the *Nonpareil* of Council Bluffs says "we cannot afford to overlook the facts." *The Evening Telegram* of New York City points out that "the American consumer is at the mercy of the foreign manufacturer," in the matter of newsprint, and the *Louisville Courier-Journal* calls attention to the fact that the "time will come, of course, when building with wood will be out of the question unless there is an early development of reforestation." Some of the editorial co-operation on the part of the editors follows:

Louisville Courier-Journal: The American Forestry Association reminds the public of facts. The time will come, of course, when building with wood will be out of the question unless there is is an early development of reforestation. The wide use of wood for residences and other buildings that characterizes the United States would not be permitted in any European country. As long as timber was plentiful and cheap the frame house, in town or country, had so many advocates that there was little disposition to place wood construction under the ban.

Only a few American cities have building ordinances under which frame construction is forbidden, but it will not be necessary to forbid frame construction, to reduce the fire risk, if the supply of timber continues to diminish at the present rate and the price of lumber, as a result, continues to rise. This country already has reached the point at which, upon the ground of economy, permanent construction of stone, concrete, concrete blocks, hollow tile or other non-combustible and non-rotting material is considered by many builders as against wood, with its limited life and high maintenance cost.

Indianapolis Star: At last the importance of tree planting seems to have taken hold in quarters where practical results will follow. A number of citizens of prominence are urging the Massachusetts Legislature to advocate the passage of a pending bill to allow the State to buy 250,000 acres of waste land for reforestation purposes. In other directions public action has not been waited for. According to the AMERICAN FORESTRY Magazine, many coal companies, which need much mine timber, are planting trees on their own territory in great numbers. Already, it is said, newspaper and book publishers are planning the control and protection of existing forests, from which wood pulp is derived, and the systematic planting of trees. The public has been slow in realizing the growing scarcity of timber, but now that it is beginning to do so, tree planting is likely to become an active industry.

THE SCHOOLMA'AM AND THE FORESTER

Salt Lake Deseret News

Travelers in some of the unfrequented or sparsely settled regions of the country where national forests are located have perhaps wondered whence came all the established school teachers who were met in these journeys, and how it was that they seemed so cheerful and contented. The interesting explanation is given in the "American Forestry" Magazine. One curious fact is that approximately 75 per cent of the forest rangers marry school teachers, consequently the latter are at home and happy in the districts where they and their spouses serve. Another reason is that 25 per cent of all receipts from the national forests go to the counties in which they lie, to be used for schools and roads. These counties can therefore well afford to employ good teachers at good salaries, and are able to provide plenty of teachers, regardless of the number of pupils.

The explanation is highly satisfactory, and the condition would seem to be at once romantic and, in most respects, ideal. The attraction for the ambitious teacher may well be believed to consist not altogether in the monetary compensation offered—the love and protection of a clean-living young forester is a prize or bonus not to be despised. Uncle Sam's forest service is not less benefited by the opportunities thus given his rangers to acquire comely, intelligent and courageous brides. On both sides the evils of lonesomeness are corrected; on both sides there is an increased sense of responsibility and a development of the fine virtues which attend the sound enjoyment of living worthily in close contact and communion with Nature.

Council Bluffs Nonpareil: Too few of our people are taking any heed of the morrow. We are living at a fast pace. And we are rapidly exhausting our natural resources. Note the statements taken from a report of the American Forestry Association. We cannot and should not overlook these serious statements. We owe it to our children to preserve for them a condition which will be tolerable. We have no right to appropriate to ourselves all the cream of the earth's products and pass on to our children a depleted soil and a country barren of its forests upon which the happiness and welfare of people largely depend.

New York Evening Telegram: The American Forestry Association now points out that one of the striking facts brought to light is the over centralization of industry in the Northeast and the Lake States. In this region the limited supply of raw material prevents expansion to meet the increasing demand. Not only is the American consumer at the mercy of the foreign manufacturer as to price, but he is in danger of an embargo. In order to reach the safe condition of independence the experts advocate the development of the industry in the Northwest and at the same time the making of plans for increased production in the East.

It used to be our boast that we were self-sufficient as to necessities. It is our duty to see that we are so again.

The Olympia Olympian: The American Forestry Association calls attention to the fact that forest fires in this country burn ten times the area of devastated France every year. Using that terrific fact as a text, Charles Lathrop Pack, president of the Association, preaches a powerful sermon on the imperative need for a national forest policy.

He explains why the penny newspaper and the two-penny newspaper are things of the past. He sees in the gradual depletion of American forestry an actual menace to education. Some of his recent utterances are alarming, and his data, carefully gathered, confirm the opinion rapidly spreading that unless the United States buckles down to forest conservation, not only will newsprint become higher, but agriculture must inevitably suffer.

But the conservation of timber for newsprint purposes is even less important than the conservation of forestry for the making of homes for human beings to live in.

Louisville Courier Journal: The St. Louis *Globe-Democrat*, in the course of an editorial upon the paper shortage, says:

There is much criticism of the newspapers for waste of paper, but the above statistics show that it is not newspaper consumption which is making the wood pulp supply inadequate to the demand. The newspapers only consume 22 per cent. The newspaper publishers are themselves suffering from the high prices and the difficulty of keeping supplied with stock as a result

FIRES ARE A WAR ON PROSPERITY

of the tremendous increase in paper consumption in a multitude of other forms than publishing papers. Seventy-eight per cent of all the paper is consumed in some other way. No possible economy and restriction of use on the part of newspaper publishers can put an end to either the shortage of the high prices, else they would have been ended before now. The matter is deeper than that. The American Forestry Association suggests several remedies, such as the development of the pulp industry in the great forests of the Northwest and Alaska, the promotion of reforestation in cutover areas, by perpetuating forest areas and by more care in collecting and using old newspapers, magazines and paper scraps of all kinds in the making of new paper. The latter is an important contribution that could be made by every household and at a profit. There is no reason why millions of dollars should go up in smoke every year through the burning of waste paper.

Undoubtedly the paper that is burned as refuse in domestic establishments—business houses nowadays use paper balers to a considerable extent—constitutes great waste. It is within the bounds of possibility to curtail this waste by propaganda in behalf of paper saving, such propaganda including directions to householders who are willing to save waste paper and sell it, but there is waste at both ends.

In the development of forestry lies the great opportunity to find relief from paper shortage which is nowadys the *Old Man of the Sea* to every publisher in America.

Vigorous support of national forestry and State forestry is one means by which the press may practice self-preservation as well as promote general welfare. Prices of lumber, no less than prices of paper, reflect the neglect of forestry, and lumber is consumed in one way or another universally.

Asheville (N. C.) Citizen: Frank A. Munsey describes a condition in the newsprint paper situation which everybody recognizes as approximately true to facts but for which nobody can offer a satisfactory solution. Within 25 years, says Mr. Munsey, the wood pulp supply will at the present rate of consumption, be exhausted. And so far no substitute for wood has been found that would not cost more, and no system of regulation has met with general support among the publishers or in Congress.

Joliet Herald: A campaign is being carried on throughout the United States by the American Forestry Association, of Washington, D. C., urging motorists to help, by planting memorial trees along the highways to beautify the roads for which hundreds of millions of dollars have been voted by the various national, State and local governing bodies. Motorists everywhere will gladly aid this excellent movement, and will undoubtedly join the Association so as to work in conformity with its plans.

Local communities and commercial interests will benefit and motorists, who are the greatest users of roads, will derive pleasure and reward for generations to come, if they, individually and collectively, co-operate in the actual planting of trees in accordance with the general plan.

Cross-country touring from the Atlantic to the Pacific is becoming more popular every year, and it will be possible eventually to have trees growing the entire distance on both sides of the 3000-mile highway, making it the most wonderful monument and "Road of Remembrance" in the world.

Yonkers Statesman: The American Forestry Association writes from Washington to ask *The Statesman* to have an editorial stirring up tree-planting "and telling your readers to register trees on our honor roll." This is it.

Last year we nudged the folks vigorously on the subject, and inspired the city to buy a lot of trees for planting. So we do not think any more prodding is required.

But tree-registering is something we have not called attention to before.

Everyone planting a tree is entitled to have it registered at Washington in the name of a hero who gave his life for his country. It thus becomes a memorial tree of record.

The New York State College of Forestry also sends out a call for memorial tree planting and directs all tree-planters to register their trees with the American Forestry Association.

"This is a great constructive piece of work," said Charles Lathrop Pack, President of the American Forestry Association. "When we interest the coming generation in the value of trees great good will result. In education will we get nearer and nearer to a national forest policy. The General Federation of Women's Clubs and patriotic organizations such as the American Legion and the Service Star Legion, are all cooperating with the American Forestry Association."

Every individual or organization planting a tree is urged to resister it with the American Forestry Association and get the free certificate of registration which it will send.

Chicago Journal: The devastated woods of France where American soldiers fought will be planted to American trees. The Forestry Association of this country has shipped a large quantity of seeds to France already, and more will follow. With characteristic perception of the graceful thing to do, the French seized upon this plan as providing the most fitting monument for the young crusaders who came so far to fight in a just cause.

It is, indeed, a most worthy plan. For centuries to come, Americans will make pilgrimages to those battlefields, and every pilgrim will feel an added sense of possession and of sacrifice if the familiar trees of America shade the places where American soldiers died. Our firs and pines in the Argonne, our ash trees at Belleau, our oaks at Chateau Thierry will be silent, appropriate and effective reminders of the price at which liberty was saved, and of the union of the nations without which salvation would have been impossible.

Ashland, Kentucky, Independent: Arbor Day should be given a more general observance in the State than has been shown in the past. Former years have seen the gospel of the love of trees spread mostly among pupils of the schools, the youngsters of the present day. This year every thinking man and woman ought to show interest in it, help it along, encourage the youngsters and develop the love of trees and the interest in forestry in the hearts of both young and old. The world needs trees, needs them far more than in former years, because there has been a frightful sacrifice of trees to the demands of war. Nations have stripped their areas of their best timber, great waste has taken place, acres are denuded and cry aloud for restoration. Planting trees has been most commendable in the past but now it is a patriotic duty, an opportunity for service to the world and to the generations to come.

Norwich Bulletin: It cannot fail to be appreciated that the shipment of tree seeds to Europe by the American Forestry Association, as its contribution to the help needed across the water to restore former conditions, is bound to be of great assistance in meeting the future needs of the devastated areas. These countries have, of course, already commenced work along a similar line but there is much to be done and such an addition to the new timberland as will result from this aid will be simply adding another to the many visible signs of the ties of friendship that have been created among these nations. It should likewise help to arouse this country to the need of giving increased attention to its own situation.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

TUSCALOOSA, ALA.

By Tuscaloosa Post, American Legion: Fred R. Brown (2), Judge Tally Morgan (2), Andrew Dixon (2).

COCHISE, ARIZONA

By Eldorado School: Virgil Amalong.

FORT SMITH, ARKANSAS

By United Daughters of the Confederacy: Frank Alfino, Archie Barton, Claude B. Cross, Amos Crisp, Keith Dyer, Jack Etter, John Elliot, John Escue, Victor Ellig, Martin P. Head, Jack Henry, Thomas Jameson, Leo Madden, Robert Lee McKenzie, Frank Napier, Oscar Perry, Ike Quinn, Glenn Rayburn, Thomas Robinson, James R. Scarborough, Ernest Schlaefli, Earl Edward Trent, James Watt.

ANDERSON, CALIF.

Women's Improvement Club: Cecil Pleisch, Carrol C. Corbin, Nelson J. Peterson.

LOS ANGELES, CALIF.

By Los Angeles Audubon Society: Sons, Grandsons and Brothers.

EAST HAMPTON, CONN.

By Cavanaugh-Treadway Post No. 64, American Legion: Patrick A. Cavanaugh, Nelson Tucker, Clarence Treadway, Clarence Coe.

DOVER, DEL.

By Dover Century Club: Our Dover Boys.

MILFORD, DEL.

By Miss M. Sharp: Richard Sanders Truitt. By Mrs. G. Layton Grier: Lieut. Paris T. Carlisle.

SMYRNA, DEL.

By Twentieth Century Club: Soldiers and Sailors of World War.

WASHINGTON, D. C.

By Washington Animal Rescue League: Remember the Animals and Birds that Fell.

ADAIRSVILLE, GA.

By Sans Souci Club: Lieut. Burton Paul Bradley, Sgt. Robert Burns.

ALBANY, GA.

By Presbyterian Church: Ralph Pierce.

DOUGLASVILLE, GA.

By Civic Club: Alton Brittain, Frank P. Dorris, Ben Head, Owen Strandridge, Mr. Darden.

MILLEDGEVILLE, GA.

By Federated Women's Clubs: William Singleton Morris, James Franklin Little, Eddie Q. Brown, Robert Lee Roberson, Morris Vinson, Furman F. Lee, Fleming Du B. Vaughan, Joseph Woodson Wood, Newton Maxwell, Roger Smith, Powell Anderson, William Beck, Whit Railey, John Hancock, Quince Hancock, Carleton Lothridge, Henry Lingould, R. B. Heath, Carl Allen, Elyah Allen, Leroy Napier, Rollin Lawrence, Charles Du Bose, George W. Carr, William Long, Lonnie Binford, John Binford, Harper Taylor.

SPARTA, GA.

By Hancock County Federation of Women's Clubs: John Gordon Baugh, Timmons Bonyer, Clifford T. Darden, Henry Baker Fleming, Jesse W. Logue, Paul Marchman, William Holsey Shivers.

COLLINSVILLE, ILL.

By House-Hold Science Club: Leighton Humphrey Evatt, James Dukes, Frank Stucker, Andrew Karvolet, Eugene Kohler, Howard Dailey, Frank Guatto, Joseph Verneuil, August Karvelot, Bernard R. Peipmeyer, Ben Borgias, Bernard Rissi, George Ganniger, John Snadden, Mike Evanko, Albert Hadfield, Andy Pinson, John Ranier.

EVANSTON, ILL.

By Children of American Revolution: Evanston Heroes.

PARK RIDGE, ILL.

By Mrs. C. D. Bradley: Marjorie MacBride Bradley.

ROCKFORD, ILL.

By G. J. Boehland: Luke Hieronimus, Jr.

SOLON MILLS, ILL.

By Paul C. Hoffman Post No. 253: Paul C. Hoffman.

URBANA, ILL.

By Mr. Edwin Bay: Charles Henry Lee.

GREENSBURG, IND.

By High School: Vernie Wamsley.

DES MOINES, IOWA

By Service Star Legion: Our Boys. By Soldiers and Sailors Father's League: Our Boys.

DURANT, IOWA

By Durant Schools: Lieut. J. L. Shryer.

GREENFIELD, IOWA

By Service Star Legion: Our Boys.

PETERSON, IOWA

By Dean-Underwood Post, American Legion: Lieut. Lester Allison, Robert E. Dean, Milo E. Underwood, Harry D. Gordon. By Halvor Berg: Theodore Roosevelt.

TOPEKA, KANS.

By Woman's National Farm and Garden Association; Victor Kenney Dodge Blakely.

LOUISVILLE, KY.

By St. Mark's Episcopal Church: Lieut. Edward Garrett.

MELBOURNE, KY.

By St. John's Lutheran Church: Ray Layfield, William Rehg, Harry Yung, Gus Yung, Ed. Glahn.

GREENWOOD, LA.

By Greenwood Church: Timmons Alexander, George Bryson, Ralph Mays, Will Dinkins, Walter Greer, Theodore Carter, John T. Dunn, Arthur Dunn, Joe W. Dunn, John Bayliss, Bradford Thweatt.

HINCKLEY, MAINE

By Good Will Home Association: John A. McNally, William B. Bates, Hollie C. Simpson, Harold R. Temme, Lee Thompson, Hugh Hill, Lester Ballou, Allison Peardon, Carl M. Barnard, Samuel C. Bush, Roy Lake, Woodford N. West.

MATTAPOISETT, MASS.

By Army and Navy Memorial Association: L. Florence Eastman.

SPENCER, MASS.

By Isaac Prouty and Company: Frank L. Kirk, Joseph X. Gaudette, Moses Collette, Jr., Henry Ducasse, Albert T. Cournoyer, Charles Edward Farquharson, Harold Barker Torrey, George Raymond Eggleton, George T. Corron, Ward G. Howland, Napoleon Joseph Ledoux, Albert Luther Peck, Leon A. Baribault.

ISHPEMING, MICH.

By Service Club: Albert B. Braden.

MARQUETTE, MICH.

By Women's Welfare Club: Kurtis Anderson, Francis Bashaw, John J. Holland, Arthur E. Robbins.

FORT BENTON, MONT.

By Fort Benton Woman's Clubs: Chateau County Boys who made Supreme Sacrifice in the War.

JACKSON, MISS.

By Jackson High School: Henry Graves, R. W. Fryant, W. S. Graves, Ed Chapman.

BORDENTOWN, N. J.

By Bordentown Military Institute: Donald E. Campbell.

ELIZABETH, N. J.

By Mary Wilkenshaw: Theodore Roosevelt, Quentin Roosevelt.

OCEAN GROVE, N. J.

By Campmeeting Association: Dr. Aaron E Ballard, John King, Rev. Dr. Henry C. McBride.

ALBANY, N. Y.

By New York State College for Teachers: Raymond Temple Clapp, James Oran Johnson, Raymond Oscar Ludwick. Lieut. Edward Eldred Potter, Earl John Van Hoosen, Frank Bronk Story, Gertrude Crissey Valentine.

AUBURN, N. Y.

By Mrs. M. S. Irish: Sgt. William H Ward, Corp. Clyde Mead, Mather De St. Croix.

BINGHAMTON, N. Y.

By Civic Club: Capt. John Case Phelps. Joseph P. Hanley, Joseph Yamau, Spencer Kellam, Joseph Bires, Edward R. Peterson, John Charles J. McDevitt, Hermann James Britton, John J. Nolan, Frank Chester Dimmick, Michael D. O'Sullivan, James H. Murphy, Cleon T. Hoff, William Francis Rider, Stanley L. Rockwell, Charles L. Schildnecht, Milton E. Dye, Merwin T. Jones, Arrington Winfield Kinney, Charles T. Tate, Charles I. McGraw, Richard J. Hoyt, William E. Lippacher, Carl Frank Johnson, Elmer Joseph Decker, Corp. John L. Livingston, Sgt. Charles G. Greene, Sgt. John Leo McDonald, Sgt. Herman E. Jones, Sgt. James A. Hutchings, Sgt. Charles W. Trumble, Maj. Harold D. MacLanahan, Capt. Alexander D. Wilson, Arthur Henry Andrews, Henry James Keough, Corp. John Moran, Corp. William Joseph Clark, Corp. Robert G. Davis, Corp. Herbert B. Norton, Corp. Robert Leo Flanagan, Corp. Fred Clark White, Corp. Walter J. Murphy.

BROOKLYN, N. Y.

By Lexington Council, K. of C.: John Christopher Sheehan, George Alphonsus Black, Francis James Foley, Thomas Raymond Nulty.

NEW YORK CITY

By S. Rankin Drew Post, American Legion: Lieut. S. Rankin Drew. By Mr. J. S. Kaplan: Lieut. Murray E. Cramer. By Washington Heights Chapter, American War Mothers: Boys Killed from the 102nd Engineers, 27th Division.

NORWICH, N. Y.

By Steadfast Circle, Kings Daughters and Sons: Robert Barnes.

RED CREEK, N. Y.

By Red Creek High School: Carl Peterson.

WESTFIELD, N. Y.

By American Legion: Cecil A. Johnson, Joseph A. Militello, Ralph Pomeroy, John W. Rogers, Salvidore Castrogiovanni, Tussi Scime. Philip E. Carling, Wayne G. Franklin, Daniel Hoss.

FORT BERRY, VA.

By Columbus Country Club, Matthew J. Myers.



Andrew Rodgers, Gardener, estate of Mrs. Ethel D. Mellor.

View of avenue and house on the estate of Mrs. Ethel D. Mellor, Plymouth, Mass. Note work done on several of the trees.

The Tribute of Andrew Rodgers to Davey Tree Surgery

130 Court Street, Plymouth, Mass.

The Davey Tree Expert Co.,
Kent, Ohio.

Dear Sirs:

Your experts having operated upon the trees at this estate for three successive years, I have had every opportunity of watching very closely their most interesting and valuable work.

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Admitting that it is up to every gardener to secure the very best seed and nursery stock in order to insure giving satisfaction in his crops, flowers and shrubs, is it not logical then that the wonderful specimen trees should have the attention of the highest authorities? Experts trained only for this particular business should always be the first consideration. The very best is not too good, but a doubtful proposition is dangerous to recommend to any estate owner.

Your treatment on the trees here will stand any investigation.

With all good wishes

Sincerely yours,
(*Signed*) Andrew Rodgers.
Gardener to Mrs. Ethel D. Mellor.



This tree was treated and restored to health in 1917. Note how concrete has been placed in the cavity, section on section, to allow for swaying and prevent cracking. Note also view of Pilgrim Monument in the background.

The saving of priceless trees is a matter of first importance on every estate. Davey Tree Surgery is a fulfillment of the maximum expectations of those who love and value trees. A careful examination of your trees will be made by appointment.

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JOHN DAVEY
Father of Tree Surgery

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BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.35
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	2.50
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	2.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.35
LUMBER AND ITS USES—R. S. Kellogg	2.15
THE CARE OF TREES IN LAWN, STREET AND PARK—B. E. Fernow	2.17
NORTH AMERICAN TREES—N. L. Britton	7.30
KEY TO THE TREES—Collins and Preston	1.50
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record	1.75
PLANE SURVEYING—John C. Tracy	3.00
FOREST MENSURATION—Henry Solon Graves	4.00
FOREST PRODUCTS—By Nelson Courtlandt Brown	3.85
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FIRST BOOK OF FORESTRY—Filibert Roth	1.10
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TREES—H. Marshall Ward	1.50
OUR NATIONAL PARKS—John Muir	1.91
PRACTICAL FORESTRY—John Gifford	2.50
LOGGING—Ralph C. Bryant	4.00
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott	2.50
FORESTRY IN NEW ENGLAND—Ralph C. Hawley and Austin F. Hawes	3.50
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves	2.00
SHADE TREES IN TOWNS AND CITIES—William Solotaroff	3.00
THE TREE GUIDE—By Julia Ellen Rogers	2.12
MANUAL FOR NORTHERN WOODSMEN—Austin Cary	.57
FARM FORESTRY—Alfred Akerman	
THE THEORY AND PRACTICE OF WORKING PLANS (in forest organization)—A. B. Recknagel	2.10
ELEMENTS OF FORESTRY—F. F. Moon and N. C. Brown	2.50
MECHANICAL PROPERTIES OF WOOD—Samuel J. Record	1.75
STUDIES OF TREES—J. J. Levison	1.75
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THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss	3.00
SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY—By James W. Toumey	3.50
FUTURE OF FOREST TREES—By Dr. Harold Unwin	2.25
FIELD BOOK OF AMERICAN TREES AND SHRUBS—F. Schuyler Mathews	2.00
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THE BOOK OF FORESTRY—By Frederick F. Moon	2.10
OUR FIELD AND FOREST TREES—By Maud Going	1.50
HANDBOOK FOR RANGERS AND WOODSMEN—By Jay L. B. Taylor	2.50
THE LAND WE LIVE IN—By Overton Price	1.70
WOOD AND FOREST—By William Noyes	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.	2.50
MANUAL OF POISONOUS PLANTS—By L. H. Pammel	5.35
WOOD AND OTHER ORGANIC STRUCTURAL MATERIALS—Chas. H. Snow	5.00
EXERCISES IN FOREST MENSURATION—Winkenwerder and Clark	1.50
OUR NATIONAL FORESTS—H. D. Boerker	2.50
MANUAL OF TREE DISEASES—Howard Rankin	2.50
THE BOOK OF THE NATIONAL PARKS—By Robert Sterling Yard	3.10
THE STORY OF THE FOREST—By J. Gordon Dorrance	.65
FOREST MANAGEMENT—By A. B. Recknagel and John Bentley, Jr.	2.60
THE FOREST RANGER AND OTHER VERSE—By John Guthrie	1.60
TIMBER, ITS STRENGTH, SEASONING AND GRADING—By H. S. Betts	3.10
THE HISTORIC TREES OF MASSACHUSETTS—By J. R. Simmons	3.65
TIMBERS—AND THEIR USES—By Wrenn Winn	5.15
THE KILN DRYING OF LUMBER—By Harry D. Tiemann	4.65

* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

BOOK REVIEWS

"Our Northern Autumn," by Harriet L. Keeler. Charles Scribner's Sons, New York, $1.75.

Just from the press, this book will be welcome in that it gives a study of the characteristic flowers of autumn, its brilliant foliage and its conspicuous fruits, with some illustrations in color. "In our Trans-Atlantic country," wrote Thackeray in "Henry Esmond," "we have a season—the calmest and most delightful of the year, which we call the Indian Summer." It is this typical and loved American season, its flowers, foliage, buds and fruits, that the author covers in this, her latest book, with the inspiration and the completeness that have distinguished her former works. An important section is devoted to the most

beautiful and characteristic feature of the autumn landscape, autumnal foliage, the reason for the change in coloration and the order in which it takes place in the different species of trees, and there are several interesting illustrations in color.

"What Bird is That?" by Frank M. Chapman. D. Appleton & Company, New York City, $1.25 net.

A new kind of bird book by a well known authority, this not only shows the color and chief markings of each bird but also shows whether a bird is large or small. Moreover, by means of group pictures, it shows all the birds arranged according to season. With these two features to aid one, the identification of the various birds is easy, even for beginners. The author, who is Curator of Birds in the American Museum of Natural History, has given us in this work a complete guide to every land bird east of the Rocky Mountains—some three hundred species in all, and they are all pictured. The text covers most interestingly the distinguishing marks, the range, nests, eggs and song of each bird, and the localities where and seasons when it may be found. Every person who has ever wanted to know the birds should have this book as it is the simplest and most authoritative work to be had. It is extremely interesting and will hold the attention of the bird lover from cover to cover.

"Cornell Forester."—Dressed in a striking campfire cover, the "Cornell Forester," Vol I, June, 1920, is interesting from beginning to end.

Put out annually by the Cornell Foresters, this publication has become an institution, and this particular issue, dedicated as an appreciation to Professor Ralph S. Hosmer, reflects honor on its editorial staff, and the Club generally responsible for it. With articles from the pen of W. B. Greeley, recently appointed Chief Forester of the United States; George D. Pratt, Conservation Commissioner of New York, and many of the well known teachers of forestry at the leading universities of the country, interspersed with bits of characteristic verse and news notes, there is not a dull moment all the way through. The "Cornell Forester" may be had by application to the college at Ithaca for one dollar a copy.

"The United States Forest Policy," by John Ise. Yale University Press, New Haven, Conn., $5.00.

This is one of the important books of the year to the profession and to the people at large, as it is a non-technical treatment of the vital topic of forestry. It discusses the development of an interest in forest conservation, the legislation dealing with the forests, and the many unwise laws under which forest lands have been stolen or the forests destroyed. Several chapters are devoted to the results of our forest policy in the past and the final chapter gives suggestions for a wiser policy in the future.

"AMERICAN FORESTRY and the *Geographic* magazine are the best publications in the country. A near neighbor in our small community takes them both and we reciprocate with our reading matter. Otherwise I should subscribe," says J. F. Scott, in a recent letter to the editor.

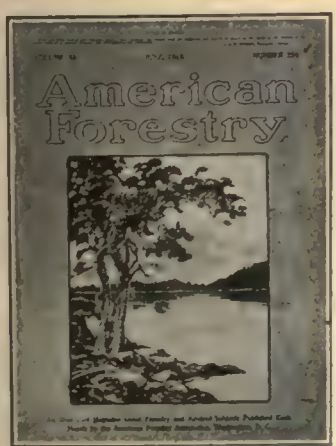
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FORESTER FOR FRANKLIN COUNTY

THE interest which the wood-using industries are taking in the problems of forestry as taught by the New York State College of Forestry at Syracuse has been shown by the engagement of Prof. H. S. Henderson, of the Department of Forest Utilization, to spend the summer with the H. H. Franklin Manufacturing Company (makers of the Franklin car) doing special work in the dry kiln department, sawmill and storage yards.

Professor Henderson's work in the short course for dry kiln engineers brought him in close touch with the Franklin Company, which sent four of its foreman and wood specialists to take some of the class work in this short course. Professor Henderson has closed arrangements to spend the summer with the Franklin Company, which uses very large quantities of second growth white ash in the manufacture of the wood sill for the Franklin car.

STATE NEWS

ARIZONA

ABANDONMENT of unextinguished camp fires proved the undoing of two citizens of Coconino County recently. The abandonment of the fires, in itself a violation of the Arizona State Laws, was further magnified by forest fires of a destructive character which broke out as a result of the neglected embers. This led to the eventual discovery of the cause of the fires and additional evidence unearthed the culprits, who were tried and fined.

Both of the cases were handled by Deputy Supervisor C. W. McKenzie, of the Coconia National Forest.

CALIFORNIA

"WE are naturally vitally interested in the perpetuation of forest resources," writes C. Stowell Smith, Secretary-Manager of the California White and Sugar Pine Manufacturers Association to AMERICAN FORESTRY. "This is illustrated by the fact that we have established in California a committee to study forest problems and recommend such measures as may be necessary to meet the situation. This committee is probably the most representative organization of its kind in the country. It includes the local District Forester of the United States Forest Service, the Dean of the Forest School, University of California, the State Forester, a representative from the Southern Pacific Railroad (which is a large owner of timberland) and a representative from the California pine industry. These interests have employed a forester, and he is now at work studying all available information and from time to time recommending policies to the committee.

"You are probably familiar with the situation in this region and the relative ease with which our forests can be kept on a producing basis. Statistics prepared by the Forest Service show that 65 per cent of the privately owned cut-over lands in California are well stocked with young growing timber. A few simple additional measures, therefore, will suffice to solve the forest problem insofar as California is concerned."

KENTUCKY

THE forestry situation in Kentucky is outlined in the Louisville-Courier Journal as follows:

Entire abandonment of any forestry policy, notwithstand the act of 1920, putting the forester in the Department of Agriculture, may be the outcome of the legislation. Governor Morrow's purpose was to abolish the office of forester entirely, but Republicans in the Senate balked at this, many coming from the mountains, where they are beginning to realize the importance of reforestation and conservation.

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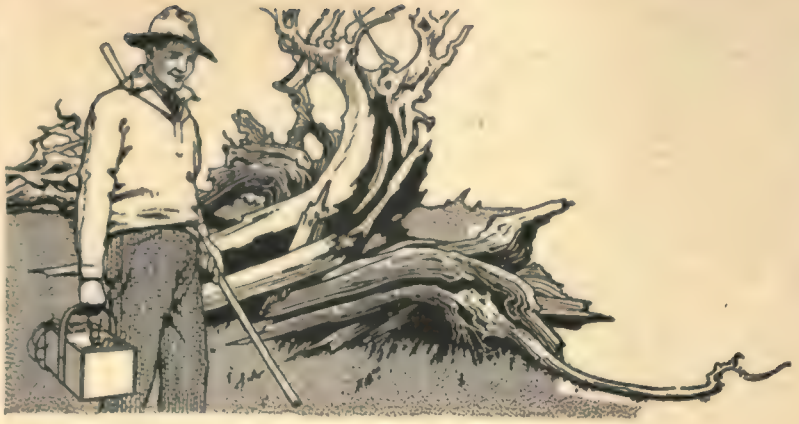
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The present law was a compromise, carrying $6,000, of which $3,000 is for the salary of a graduate forester with practical and technical experience. Commissioner W. C. Hanna was not keen to have the department thrust on him, especially when he learned that the appropriation, already insufficient, was to be cut down to little more than salary and expenses for his technical man. Now, he finds himself with a tree nursery and a forest reserve on his hands, with the Government asking him to continue co-operative work in fire prevention, in which State Forester J. E. Barton had enlisted agencies in Tennessee, Virginia and West Virginia to protect the borders.

Mr. Barton is going with an Eastern Kentucky coal company. He is probably the only qualified man in the State. It is known that at one time Murray Bruner, now in Government service in Porto Rico, was offered the post, but he declined. He is a brother of Dr. Ben L. Bruner, of Louisville, former Secretary of State.

J. A. Mitchell, Inspector of the Federal Bureau of Forestry, was here recently in the interest of co-operative work, but left without learning what the policy will be.

It is probable that the nursery on State Fair property at Louisville will be abandoned. The forest reserve of several thousand acres on Pine Mountain, in Harlan County, which Forester Barton obtained from the Kentenia-Catron Corporation, stands and probably will stand just as it was when it was deeded to the State.

Another corporation was ready to deed to the State some 3,000 acres adjoining, but this project was dropped by the forester when it was seen that there was no hope of "carrying on" with the plan of demonstrating reforestation in the Eastern Kentucky watershed.

Coal and timber operators of Eastern Kentucky had formed fire prevention associations, employed lookouts, established stations under direction of the forester and assisted in spreading propaganda against carelessness, which was responsible for most forest fires. One or two had engaged foresters and a large number had taken up with the State Forester discussion of steps necessary for reforestation of mountain sides. Demonstration and practical help were considered essential to getting results. Efforts in this direction, however, lapsed several months ago, and the interest at that time keen, apparently has waned.

It is doubtful whether any of the forestry appropriation will be spent, unless for employment of a clerk or so.

LOUISIANA

THERE are 12,000,000 acres of idle cut-over lands in Louisiana, and not 5,000,000 acres of land under cultivation, says Henry Hardtner, president of the Louisiana Forest Association.

Idle cut-over lands produce neither timber, farm crops, nor income to meet taxes, so they must be put to work. Intention to sell cut-over lands, for the purchaser to clear and cultivate, will not in itself make these lands productive nor excuse denudation. While awaiting development, cut-over pine lands should be growing stock or another crop of timber, preferably both. Prospective farmers want some timber on these lands, otherwise they will be forced to buy wood, even for fence posts and fuel, at high prices, or go without.

Where are the people going to get their timber supplies when all the forests of Louisiana and adjoining States have been cut clean and permantly ruined?

The leaving of seed trees on cut-over pine lands is the first step in solving these problems. Without seed trees there can be no natural reforestation of pine.

Should the State spend large sums in the future to purchase and plant denuded cut-over pine lands when it can prevent this denudation by requiring pine seed trees to be left for natural restocking? Can land owners expect the State to relieve them of the burden of cut-over land holdings if they refuse to provide for this restocking by leaving pine seed trees?

Cut-over pine lands on which seed trees are left are worth twice what they would be without these trees, for they will be earning an income; from the growth of the seed trees, and from new crop of young timber, without diminishing their prospective value for agriculture, or interfering with grazing. Prospective farms with some timber and a woodlot are more valuable than skinned cut-over lands; for pasture, because of desirable shade trees; for revenue, because of income and home use of wood; for homes, because of greater attractiveness.

The State Conservation Commission should be given the power to enforce the provisions of a law to protect the future welfare of the people of Louisiana.

MICHIGAN

THE co-operation of rural mail carriers with the forest fire supervisors in northern Michigan is a plan recently devised by one of the deputy fire marshals in

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the forest districts of that State. The fact that millions of dollars worth of standing timber and seedlings are annually destroyed by flames lead this fire marshal to arrange for a daily patrol of the regions imperiled by fires by using the services of the rural free delivery carriers. On their daily trips if a fire is discovered, the carrier will record on cards specially prepared for the purpose the name of the county, time of detection, location of flames, the name of the official notified (usually the fire supervisor) and any other pertinet particulars, with the signature and number of route of carrier. The supervisor, thereupon, organizes suitable fire-fighting forces and undertakes the extinction of the fire. The plan has already been adopted for trial in one country, and it is proposed to carry it into other counties of the territory.

NEW YORK

A. B. Recknagel, secretary of the Empire State Forest Products Association, in discussing the work of the New York State Legislature in regard to forestry matters said:

"The New York legislative session of 1920 was, with respect to forestry legislation, largely one of 'hope deferred.'

"There were before the legislature a group of bills introduced by Assemblyman Everett, which amended the present plan of taxing forests by substituting a permissive yield tax (Assem. Print Nos. 513 and 2132) and which provided for free trees from the State nurseries for private planting on land dedicated to continuous forest production (Assem. Print No. 1913).

"Of these, the last named, the so-called 'free tree bill,' became law with the governor's signature on May 5. Of the former one, amending the tax law (Pr. No. 513), is in the governor's hands; the other, ing the conservation law, 'died' in the Senate. One tax measure is of no value without the other, so that it matters little whether the governor signs the bill before him or not.

"There was also before the legislature the so-called 'ten district foresters' bill (Assembly Print No 1264) fathered by the conservation commission. This bill 'died' in the Senate.

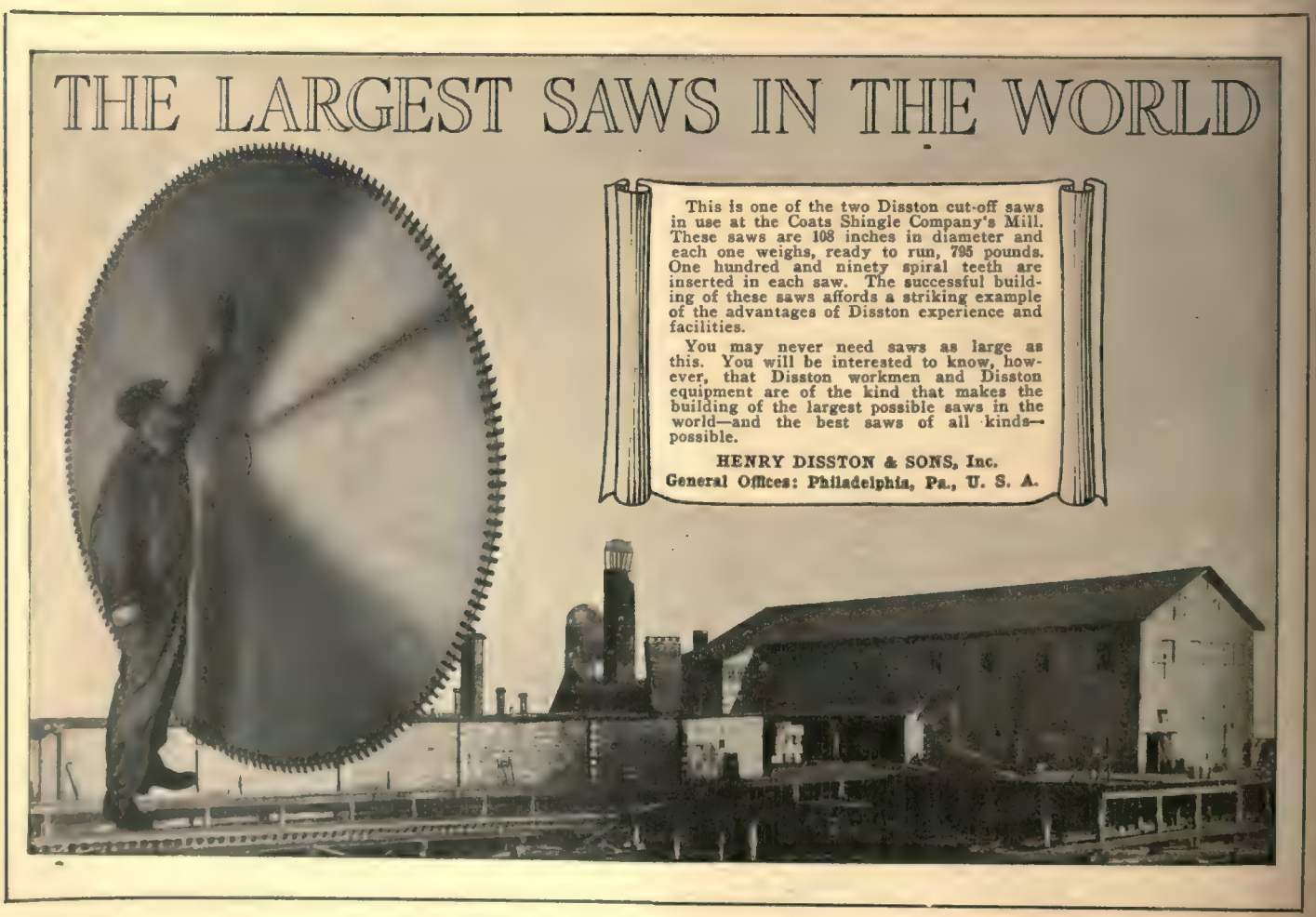
"There remains, as the one substantial achievement of the session, the enactment of the free tree bill, sponsored by the conservation commission and by the Empire State Forest Products Association. The text of this bill is as follows:

"'The commission may agree with the owner of forest land, which is in need of reforestation, to provide for the reforestation of such land under such safeguards as the commission deems necessary to insure the establishment and proper protection of such a plantation, and may furnish trees from any of the nurseries operated by such commission without charge at the nursery, provided the owner of the land will agree that the land shall be held for continuous forest production, and that no trees so planted shall be cut, except in accordance with the regulations of the commission. Such agreement shall be recorded in the office of the county clerk of the county where the land is situated, and the provisions thereof shall be deemed to be and be covenants running with the land.'"

NORTH CAROLINA

LUMBER is certain to lose its present importance in North Carolina and become one of the minor industries if measures for conserving present timber supplies are not taken speedily, declared Assistant Forester E. E. Carter, of the United States Forest Service, in an address before the North Carolina Forestry Association at Asheville, N. C., recently. Mr. Carter discussed the results of an investigation of lumber conditions throughout the United States which the Forest Service made in response to a resolution presented to the United States Senate by Senator Capper. This resolution called for a report on the timber supply of the country, the effects of present depletion on the high cost of materials, and the effects of lumber exports on domestic industries.

Mr. Carter's address showed that unless the young forests in North Carolina and



adjacent States are protected from fire and wisely managed, these regions which are now shipping lumber to other parts of the country soon would be forced to import supplies for their own use.

The question of adoption by the State of a definite forest policy came up for discussion. The need for such a policy, including an adequate organization for the prevention and suppression of forest fires was emphasized by the assistant forester, as it had also been emphasized in the Forest Service report to the Senate.

Although North Carolina still has a considerable amount of timber, cutting is progressing at a rapid rate and the remaining old-growth forests are bound to disappear unless a definite conservation program is adopted by the State. On account of the mountainous character of a large part of the State and the heavy rainfall it is said by foresters to be all important to take steps now to prevent denudation of important watersheds.

NEW YORK STATE COLLEGE OF FORESTRY AT SYRACUSE

"A NEW high mark was set in every form of college work by the first post war year of the New York State College of Forestry at Syracuse," declared Dean F. F. Moon to the trustees of the college, during their annual meeting. The trustees advanced two professors in grade, in recognition of long and efficient service, and confirmed the appointment of two members of the faculty, named during the year. Assistant Professor Carl J. Drake, of the Department of Forest Entomology, who has been doing notable research work among insects attacking trees, was advanced to a professorship, and Assistant professor Reuben P. Pritchard, of the Department of Silviculture was advanced to a full professorship in the same department. The appointments of H. L. Hankinson, as Professor of Ichthyology, in the Roosevelt Wild Life Forest Experiment Station, and of C. Earl Libby, as assistant professor in charge of the pulp and paper making, were confirmed.

Among the features of Dean Moon's report were the following items: The New-York State College of Forestry had the largest attendance the past year of any American forest school; a freshman class of 120 broke all records; the demand for trained men is phenomenal, there being 400 calls for fully or partially trained foresters for permanent or summer work this year, with only fifty men available, these calls from about 80 prospective employers; important research work, particularly involving the paper industry, and the use of yellow birch is under way, and the call for lectures on forestry from the State has been so great that the State can no longer bear the expense of sending the speakers free, but must ask that those desiring speakers pay the expenses of the lecturers.



THOMPSON



FAIRPORT

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Mr. John Roos, 9 W. 46th Street, Covington, Ky., writes under date of September, 1919, as follows:

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FOREST SCHOOL NOTES

CORNELL SUMMER SCHOOL

INSTRUCTION in forestry at Cornell during the summer session was mainly out-of-doors. From the windows of the Forestry Building, one can look out over a nearby woodland, to which the field trips are made. These trips afford practical observation of the fundamental facts of forestry and its application and give background to the lectures.

Two courses are offered by the Department of Forestry. One gives facts about trees and forests, fundamental to their right use, and the other covers the field of forestry, to reveal its nature, its scope, and the important place it holds in a national economy.

The first lays emphasis on simple means of identifying the principal forest trees. It includes study on the characteristics of forest trees and forests, identification of some of the more important kinds of wood, and work leading to an understanding of the methods of handling forests to promote their growth and renewal.

The other course treats of the usefulness of the forests of the United States in wood production, and the indirect influences, such as that on the flow of streams. The principal branches of forestry are discussed and the nature of Federal, State and private forestry is pointed out. Both courses afforded an insight into forestry knowledge and furnish information useful to teachers of nature study, history, geography, civics, and manual training.

FOREST SCHOOL, UNIVERSITY OF IDAHO

A PARTY of foresters from the University of Idaho are at Chatcelet, where they will make a reconnaissance study of Reyburn Park. The work is done at the request of Wm. J. Hall, Commissioner of Public Works for Idaho. The park is beautifully situated on Chatcelet Lake, an arm of Lake Coeur d'Alene. It comprises some twelve thousand acres, including timberland and water, and was purchased by the State in 1909 as a State park. A part of the timber has been sold, and is being cut under such regulations as will safeguard forest renewal. The trees cut are first marked by the State agent in charge, and the purchasers are under contract to pile and burn the brush. The reconnaissance study and report to be made by the School of Forestry will include a topographic map of the area, a cruise of the timber, a silvicultural plan for the management of the timber resources, a plan for the further development of the recreational facilities of the park, suggestions for fire protection, and a statement of the cost of maintenance and sources of income. In making recommendations for the management of the park, it will be borne in mind that it was purchased and set aside primarily for recreational uses rather than for timber production. Every effort will be made to preserve to the fullest degree possible the scenic value of the lake front. The study will be made under the direction of Dean F. G. Miller and Dr. Henry Schmitz.

SCHOOL OF FORESTRY, OREGON AGRICULTURAL COLLEGE

THE annual field trip of the School of Forestry, of the Oregon Agricultural College was made in May. Forty members of the school went into the timbered region on the east slope of Mary's Peak, fifteen miles west of Corvallis. The outfit was divided into mess crews of three to five men each. These individual groups did their own cooking. An area of 2,560 acres was carefully cruised and data collected for topographic maps. The strip method used by the Federal Forest Service was employed in timber cruising. Ten per cent of the area was actually cruised, the forties being "double run."

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made its spring field trip to the operations of the Coast Range Lumber Company at Mabel, Oregon. A section of timber was carefully cruised and mapped. Logging operations for the area were planned. The necessary railroad locations were made, landings located, etc. In addition to doing this work, the entire town site of the town of Mabel was surveyed and mapped. All this was practical work, which, when completed, was turned over to the Coast Range Lumber Company for its use.

Practically every man connected with the School of Forestry has found summer employment, either with the Forest Service or in the woods and mills of the Pacific Northwest. The demand for labor is such that the school has been unable to furnish the men needed for various kinds of work.

DEAN MOON OF SYRACUSE

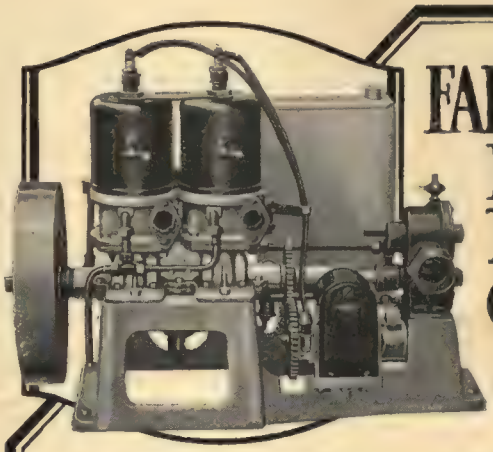
FRANKLIN MOON has been elected Dean of the New York State College of Forestry, at Syracuse, by the Board of Trustees. By this action, one of the earliest members of the College of Forestry faculty becomes dean of the College, for Dean Moon became Professor of Forest Engineering in 1912, a few months after the college was founded. Dean Moon was graduated from Amherst College in 1901, with degree of Bachelor of Arts. From 1902 to 1904, he was engaged in graduate study at Harvard, and was for several years in business life in New York City before he decided to take up forestry, and in 1909 secured the degree of Master of Forestry at Yale. During 1908 and 1909, he was engaged in forest reconnaisance in Connecticut and for the Federal Forest Service in Kentucky. For the next two years forester for the New York State Forest, Fish and Game Commission under Commissioner Whipple, having charge of the Highlands of the Hudson Forest Reservation, the nucleus of what is now the Palisades Interstate Park, the world's greatest park. Prior to coming to Syracuse, Dean Moon investigated forest conditions and forestry practice in France, Germany and Switzerland. He has written two noteworthy forestry books, one a text-book for forestry students and the other a forestry book for boys. He is one of the Executive Committee of the New York State Forestry Association, which has its headquarters in Syracuse, and has been honored by election to the honorary society Sigma XI and Phi Kappa Phi.

CREOSOTE OILS IN WOOD PRESERVATION

LIGHT creosote oils properly injected into wood apparently will prevent decay until the wood wears out or until it checks so badly that the untreated portions are exposed. Such is the indication of service records collected by the Forest Products Laboratory on railway ties and telegraph poles preserved with low boiling creosotes.

The railroad ties so treated lasted from 15 to 20 years, and failure was traceable in most cases to mechanical wear, such as rail cutting and spike killing. In no case was failure found to be the fault of the preservative.

Of 1,558 telegraph poles in the Montgomery-New Orleans line, which were pressure-treated with a light creosote oil, 1,049 poles were still sound after 16 years. In 91 per cent of the cases of decay, the fungi had entered the wood through checks and shakes. Representative sections in the Norfolk-Washington line showed that after 17 years' service, of the 1,614 poles inspected, 1,469 were sound, 92 decayed at the top, and 105 decayed at the ground line. The decay at the top was caused chiefly by cutting off the poles. In those decayed at the ground line, the causes of failure, as determined in 88 per cent of the cases, were checks or shakes. Here again as in the ties, the preservative outlasted the mechanical life of the wood.



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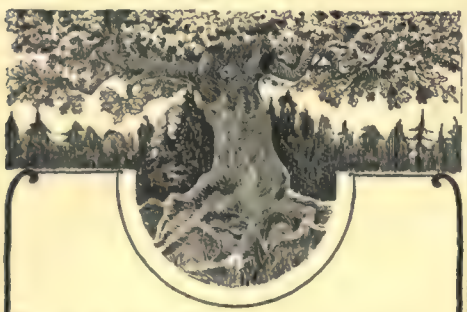


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POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C.

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C.

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C.

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A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

DISCHARGED SAILOR would like position as assistant forester or a permanent position as surveyor with some lumber company with a chance for advancement. Salary is of secondary consideration. Married, so would have to locate in some small town. Have had four years' practical experience in general forestry, and some tree surgery. Address Box 900, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C.

SUPERINTENDENT retail lumber and building material establishment desires connection with progressive lumber concern in locality where there is opportunity for growth. West, Southwest or Middle West preferred, but not essential. Several years experience retail and manufacturing, also eighteen months overseas with Forestry Engineers. Available after August 15th. Address Box 930, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C. (8-10-20)

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WASHINGTON, D. C.

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"HALL OF FAME" FOR TREES



THE LINCOLN MEMORIAL TREE

This tree, the only one in the world as far as known planted in memory of Abraham Lincoln, is nominated for a place in the Hall of Fame by A. S. Bailey, of Decorah, Iowa, where the tree now stands. The tree was planted by John Finn, who is still living. He was in Chicago when Abraham Lincoln was assassinated and he returned home much depressed. April 27, 1865, Governor Stone, of Iowa, declared as a day of mourning for Lincoln. Finn went into the woods and dug up a small huckberry shoot which he transplanted on the street in front of his home. The shoot took root and today is one of the most magnificent trees in the state of Iowa. It is now 110 feet high and nearly 12 feet in circumference. Mr. Finn is seen standing at the foot of the tree.

AMERICAN FORESTRY

VOL. XXVI SEPTEMBER, 1920 NO. 321

EDITORIAL

LUMBERMEN ENDORSE NATIONAL FOREST POLICY

THE National Lumber Manufacturers' Association, through its Forestry Committee and its Board of Directors, has gone squarely on record as favoring the "early development of an American forest policy which shall substitute for indifference or accident an intelligent, practical, equitable, and concerted program for the perpetuation of forest supplies." The Association's judgment as to what such a program should include is indicated by its suggestions for national legislation. In addition to the efforts already being made by the Federal Government to perpetuate the forests and to bring about the establishment of a National Forest policy, the Association urges the following legislation by Congress:

1. An appropriation of not less than $1,000,000 annually for co-operation by the Forest Service with States and forest owners willing to bear an equal or greater share in the costs of locally applicable systems for protecting from fire both forests and forest lands which are restocking.

2. An appropriation adequate for prompt survey of the nation's forest resources by the Forest Service, utilizing the facilities of the forest producing industries, the States and other sources of information, to determine the quantity, location, and suitability for various commercial uses of our remaining timber, to determine the approximate area, location and condition of lands chiefly valuable for timber growth, and to obtain other information bearing on the future of forest supplies.

3. Adequate provision for research by the Forest Service, through necessary experiment stations and in co-operation with available agencies, to determine desirable methods of wood utilization, wood preservation, forest reproduction, and the control of insects, disease, and other forest enemies.

4. Liberal provision for the selection and acquisition, by purchase and by exchange, of such lands as should be added to the National Forest system to assure their best protection and management in the public interest.

5. Provision for replanting such denuded areas in the National Forests as are evidently not to be restocked by natural processes.

Since State legislation is regarded by the Association as properly a matter of local self-determination, it offers on behalf of the industry as a whole no suggestions beyond the expression of certain broad principles. The most fundamental of these is that practical methods of forest protection and perpetuation are questions primarily of local interest and should therefore be the subject of State legislation, if of any. In other words, the Federal Government should be authorized to co-operate financially with States and private forest owners in the protection of forests from fire, but should be given no power either to prescribe how such protection should be effected or to require other measures necessary for the perpetuation of the forest. In line with this position is the Association's statement that "the Forest Service should be the recognized leader of public forestry thought and effort along general lines, because of its impartial position and broad education facilities, but vested with no regulatory control over State or private lands not mutually agreed to by the owners thereof for specific purposes in connection with the general policy herein suggested."

Other points of interest in connection with the general statement of principles put forth by the Association include the declaration that the growing of future timber crops must be largely, but by no means wholly, a Government and State function; and that both Government and State should therefore acquire, by purchase and by exchange of stumpage for land, much larger areas of permanent forest land than they now possess. If private owners refuse either to sell their cut-over lands or to take reasonable steps themselves to keep them in timber crops, the Government and States should be permitted to condemn any deforested land classified as suitable chiefly for forest growing and not suitable for agriculture, paying for it at prices comparable to those paid in voluntary transactions. The reimbursement of local taxing units for the loss of taxes on Government-owned land is suggested, as is also the assistance by the Federal Government in the development of a State policy in forest improvement, protection, and tax reform as to make conditions favorable for State and private forest growth. The development of a wise, consistent policy for the marketing of publicly-owned timber, to the end of permanent public good, uninfluenced by considerations of temporary revenue, is urged. So far as the forest owners themselves are concerned, the Association states that "public-spirited lumbermen will support such steps along the foregoing State and Federal lines as are practicable. Equally with the public such lumbermen should be protected against the consequences of short-sighted policy either within their own industry or elsewhere."

Much difference of opinion will doubtless exist as to the wisdom of certain specific features of the program proposed by the National Lumber Manufacturers' Asso-

ciation. Be this as it may, it is a significant and encouraging fact that for the first time a national association of forest owners and timber producers has definitely committed itself to the principle that both national and industrial welfare demand the early development of an American forest policy which shall substitute for indifference and accident a comprehensive program for the perpetuation of our forest supplies.

Much yet remains to be done in translating the principles advanced by the Association into a concrete program for Federal and State action. In passing, it may be remarked that in the development of such a program much more emphasis will have to be laid on measures to keep forest lands productive and to provide for the utilization of existing forests in such a way as to secure natural reproduction without the necessity of resorting to planting. Fire protection, both of mature and young forests, is obviously essential, but it must be supplemented by the proper silvicultural handling of the present forests if their perpetuation is to be effected economically. In general there is a tendency not to lay too much stress on the measures necessary to restore deforested lands to production, but rather to lay too little stress on the measures necessary to prevent deforestation.

Now that the lumbermen have definitely committed themselves to the support of a national forest policy, it is to be hoped that more rapid progress can be made in working out the details of such a policy, particularly with respect to the knotty problem as to the relative jurisdiction of Federal and State authorities.

FOREST PRODUCTS RESEARCH TO THE FORE

THE decennial celebration of the United States Forest Products Laboratory at Madison, Wisconsin, on July 22-23, was an event that is unique in the history of Government institutions. The celebration was planned, arranged for, and financed by friends of the Laboratory as a mark of appreciation of its ten years of service in industrial research. So far as our knowledge goes, no other Government institution has ever been similarly honored. The event was decidedly national in character, the nearly 300 visitors who participated in it coming from all over the country and even from Canada and Porto Rico. No stronger testimonial could be offered of the regard in which the Laboratory is held by those who have benefited from its activities.

The celebration was much more, however, than an exchange of congratulations on results already accomplished. To a much larger extent, emphasis was laid upon the steadily increasing need for further research regarding the properties and uses of wood and other forest products and the opportunities that lie ahead of the Laboratory in its particular field of industrial research. It is safe to say that those attending the celebration came away with a more vivid idea than ever before of the value of the scientific research in forest products by an organized force of trained investigators, and that the members of the Laboratory in turn received a broader view of their work and an inspiration of service to be rendered which will help them to greater achievements in the next 10 years than in the past.

The completion of the first decade of industrial research in forest products in this country should serve to emphasize the importance of this phase of forest activities in the development of a national forest policy. Too often in our discussion of the need for reforestation is the fact overlooked that the economical use of forest products is fully as important as their production. Making the same amount of wood go twice as far as before is as effective a means of conservation as producing twice as much material per acre as before. It is hoped that the recent celebration of the Forest Products Laboratory, by emphasizing this fact, will lead to a material expansion of our present program of research in forest products, not merely as a commercial venture which will enable the timberland owner, the lumberman, or the manufacturer to squeeze a few dollars more out of his product, but as an integral part of the movement for the protection and perpetuation of our forest resources.

WOOD-USERS ORGANIZE TO SAFEGUARD THEIR SUPPLY OF RAW MATERIAL

ON July 23, the wood-using industries of the country took action fully as significant as that taken by the National Lumber Manufacturers Association earlier in the month. For the first time in their history representatives of some 21 wood-using industries got together to discuss the future supply of the raw material on which their industries are dependent. As a result of this conference, which was called by a voluntary committee from the industries, a resolution was unanimously adopted authorizing the chairman to appoint a committee to formulate a definite plan for the organization of a committee representing all the associations of wood-users for the purpose of considering present or proposed legislation dealing with reforestation and for formulating a program of Federal and State legislation which will represent the views and interests of the wood-using industries.

It is a highly significant fact that the depletion of the timber supply of the country has now reached a point where the industries dependent upon it feel themselves forced to organize for the purpose of taking action to safeguard their future supplies. Nothing could indicate more clearly the extent to which our "inexhaustible" forest resources have been dissipated and the need for prompt action if this country is to continue to supply its own needs for wood and other forest products. That the seriousness of the present situation is fully realized by the wood-users is indicated by the remarkable unanimity of sentiment which prevailed at the conference. The shortage of many woods needed by the

industries represented was strongly emphasized, and not a single voice was raised in opposition to the plan of organizing a committee through which the wood-using industries as a whole could make themselves felt in the development of a national forest policy.

Of equal significance with the action of the wood-users in organizing themselves for action was the hearty endorsement of the movement by the representatives of lumber companies and lumber manufacturers associations present at the conference. Dr. Compton, secretary-manager of the National Lumber Manufacturers Association, voiced the general sentiment of those present when he said, "I am sure that I speak for timber owners and manufacturers as a whole when I say that the movement which you contemplate will have the very hearty endorsement of the manufacturers and the timber owners, who would be glad to have created among you the machinery by which you can carry into effect a practical plan which will preserve and largely maintain the perpetuity of the forests in which we are all interested."

The point has now been reached, therefore, where both the lumber manufacturers and the wood-users are working through their own organizations, but in complete harmony, for the development of a nation-wide forest policy which will result in the protection and perpetuation of our forest resources. It is particularly encouraging that the wood-using industries, whose relation to the forest, while intimate, is sometimes regarded as less so than that of the lumbermen, should have organized on their own initiative to take an active part in formulating and securing the practical application of a forest policy. There is no question but that the wood-users, connected as they are with practically every phase of our industrial life, can exercise a most potent and much needed influence in bringing about the adoption of a definite and effective program.

MASSACHUSETTS' NEW FORESTRY BILL

THE new Forest Act passed at the last session of the Massachusetts Legislature is in reality a substitute for the bill presented by the Massachusetts Forestry Association which was based upon an initiative petition signed by more than 31,000 citizens of the commonwealth, which provided for the purchase and replanting of 250,000 acres of land during a period of ten years, and was to be financed by a serial bond issue with interest compounded during the period of production, the annual cost of maintenance to be paid out of current revenue.

A very significant and gratifying feature of the campaign waged to secure the passage of the bill was the cordial and earnest support given it by many prominent lumbermen of the State who appeared before the Committee on Agriculture and Ways and Means, and urged the importance of the measure as the only means of preventing a serious lumber famine in the near future The support of these men was especially welcome because of their apparent indifference to forestry legislation in the past.

The Committee of Ways and Means, after many conferences with the friends of the measure, reported a bill considerably modified, reducing the amount of land to be acquired to 100,000 acres; also eliminating the bond feature. The cost of land acquired under this act must not exceed an average price of $5 per acre. If however, it is found that a sufficient amount of land cannot be acquired at this price, the Legislature may from time to time increase the rate. This act went into effect on August 5.

BUSINESS MEN FAVOR FOREST CONSERVATION

THE Eastern Shook and Wooden Box Manufacturers Association has come forward with a decidedly progressive contribution to the development of a nation-wide forest policy in approving forward-looking measures for fire protection, conservation in lumbering operations, reforestation and taxation.

The Association emphasizes particularly the importance of more adequate fire protection and compulsory slash disposal and top lopping. It recommends additional State appropriations for the work and the development of watch tower and patrol systems in those States where they are not already installed. The responsibility of the private owner in fire prevention and protection is clearly recognized and the belief is expressed that private owners should be required to participate to a reasonable extent with the State in the cost of fire protection.

The Association expresses the belief that "the time has come when all stands of forest growth, whether on privately owned lands or on publicly owned preserves, must be regarded as an asset of the State in the preservation of watersheds, protection of the public health, and conservation of public resources in other ways, as well as the preservation of the lumber supply." Recognizing these facts, it believes that private timberland owners and operators should be willing to submit cheerfully to a reasonable amount of regulation under the supervision of the Forest Departments of the various States in order to assure the perpetuation of the timber supply of the country. In addition to action by private owners, it favors the establishment of State and municipal forests and endorses heartily a campaign of public education on the entire question of the preservation of our forest resources. As one means of promoting such a campaign it has continued its Forestry Committee with instructions to co-operate with other associations and civic bodies which are interested in the forest problem.

NEW YORK'S FORESTS AND THEIR FUTURE

BY ARTHUR BERNARD RECKNAGEL

FORESTER AND SECRETARY, EMPIRE STATE FOREST PRODUCTS ASSOCIATION

THE trouble is not, as President Hadley, of Yale University once remarked, that figures will lie, but that liars will figure. And such liars are often the best meaning people in the world.

So it is with any attempts to predict the future of the forest industries of New York State. Certain definite tendencies may be observed. Certain facts as to available supplies and present consumption noted. From these premises certain deductions may be made. But like the classic syllogism: "Brutus killed Caesar"—Caesar is a word of two syllables—therefore, "Brutus killed a word of two syllables," the conclusions are apt to be false unless correctly interpreted.

The statistics of any industry—even of the forest industry, are so dry that they may be passed over after extracting only the salient facts. These are that, as a wood-producing State, New York is falling further and further behind her sister states. For example, in the matter of lumber production, a recent government bulletin shows that New York now ranks twenty-fifth with a yearly cut of 335,000,000 board feet, out of a total cut of nearly 32,000,000,000 feet in the whole country. In other words, New York State produces about one per cent of the total lumber cut of the country, whereas ten years ago it produced 680,000,000 board feet out of a total cut of nearly 45,000,000,000 feet, or about one and a half per cent of the total.

There is no need to pursue this phase of the subject. The tendency is evident. Now, how about its place as a timber consuming State? The Conservation Commission, in its report for 1919, says that "New York is the greatest user of wood of any State, the total annual consumption amounting to over one and three quarters billion board feet of lumber, in addition to one million cords of pulpwood, over one hundred and thirty thousand cords for wood alcohol and other products of distillation, and enormous quantities of other material for railroad ties, cooperage, poles and fuel wood. It has



PULP WOOD PILED BESIDE THE OPALESCENT RIVER IN THE HEART OF THE ADIRONDACKS



PULP WOOD CUT FROM A SINGLE SPRUCE TREE IN THE ADIRONDACK FOREST

been estimated that the annual lumber bill of the State is over sixty million dollars, about two-thirds of which goes outside of the State."

Consider this just a minute. New York uses, each year, one and three-quarters billion board feet of lumber. It produces each year only 335,000,000 board feet, or about one-fifth of what is used!

So, also in pulpwood. Each year New York State, the second greatest pulp and paper making State in the union, uses a million cords of pulpwood. It produces each year only half a million cords.

Thus it is evident that "Brutus" (in the sense that "Brutus" is the public, as in Barrie's play) is killing "Caesar." But "Caesar" is a word of two syllables. The first syllable is the relation of what we use to what we produce. The second syllable is the relation of what we produce to our available supplies of wood and their replenishment. In other words, regrettable as it is to find New York having to call on neighbor states for her manufactured forest products, it would not be so bad if the remaining forest areas of the State were being kept productive up to their maximum capacity. France and Germany, the leading exponents of proper forest management, have never been able to supply the national needs for wood without recourse to importation. But the "second sylla-

Table showing, for the chief timber trees in New York State, the relation between the Actual Volume Cut (Col. II) and the Volume which could be cut without diminishing the Growing Stock (Col. III). Also showing the relation between the Actual Volume of Standing Timber (Col. V) and the Volume needed to support the present rate of cutting (Col. VI).

I Species	II Actual Cut	III Allowable Cut	IV Comparison II and III	V Actual Volume	VI Needed Volume	VII Comparison V and VI
Spruce Bd. Ft.	25,800,000	30,100,000	+ 4,300,000	1,053,000,000	906,000,000	+ 147,000,000
Spruce Cords	335,000	480,000	+ 145,000	16,784,000	11,740,000	+ 5,044,000
Balsam Bd. Ft.	1,500,000	3,800,000	+ 2,300,000	132,300,000	52,700,000	+ 79,600,000
Balsam Cords	54,500	13,500	— 41,000	473,000	1,906,000	— 1,433,000
Pine, Bd. Ft.	62,700,000	7,100,000	— 55,600,000	353,600,000	3,133,000,000	—2,779,400,000
Cedar, Bd. Ft.	230,000	301,000	+ 71,000	21,100,000	16,000,000	+ 5,100,000
Hemlock Bd. Ft.	75,000,000	7,400,000	— 67,600,000	591,300,000	6,000,000,000	—5,408,700,000
Hemlock Cords	85,100	20,800	— 64,300	1,664,000	6,804,000	— 5,140,000
Poplar Bd. Ft.	1,200,000	700,000	— 500,000	13,900,000	23,300,000	— 29,400,000
Poplar Cords	22,900	8,300	— 14,600	166,000	459,000	— 293,000
Beech, Bd. Ft.	37,200,000	20,500,000	— 16,700,000	1,746,800,000	3,534,000,000	—1,787,200,000
Birch, Bd. Ft.	25,500,000	17,000,000	— 8,500,000	1,441,000,000	2,423,000,000	— 982,000,000
Maple, Bd. Ft.	55,800,000	16,200,000	— 39,600,000	1,374,000,000	5,300,000,000	—3,926,000,000

ble" is that we are not even maintaining our present production by a proper care of our available supplies. Leaving out of consideration the State Forest Preserve with its eight billion feet of standing timber, as unavailable for relief as the salty ocean water was to the Ancient Mariner dying of thirst—leaving this paradox of non-productive forestry out of consideration, there is, in the State of New York, on private forests of five hundred acres or more, a total of 8,436 million board feet and 115,731 thousand cords. This is the available supply on about six million acres of private forest holdings. The figures including the woodlots and the State Forest Preserve bring the total up to nearly twenty-six billion board feet and over 120,000,000 cords.

But we deal here, primarily, with the problem of the forest industries of the State cut more than the growing stock will permit, there is a similar reduction of capital.

This is precisely what is taking place in New York State today. The accompanying table shows that the yearly cut of our chief commercial trees is, with the exception only of spruce, balsam and cedar, far in excess of what the growing stock will support. That is, we are using up our capital without adequate replacement. This is particularly marked in pine and in hemlock, and in the group of northern hardwoods where maple is the chief sufferer due to the great inroads of recent years for flooring and for various kinds of woodenware.

The only reason why spruce and balsam fare better is due to the fact that many pulp and paper mills are



GENERAL VIEW OF AN ADIRONDACK LUMBER CAMP

larger and more productive forest properties—from these there is cut, annually, a certain amount of each species. This may be likened to drawing the interest on a capital sum. If a man has $10,000 in 4¼ per cent Liberty Bonds, the annual interest yield is $425. So, with a certain forest capital, or growing stock, the annual interest or allowable annual cut should not greatly exceed 2½ per cent if the rotation be 80 years. That is, in a forest under management for continuous production, the actual cut of any species should not greatly exceed the total available volume of that species divided by one-half the rotation. This method of determining the allowable annual cut is known as von Mantel's formula.

If the man with a capital of $10,000 draws out more than $425 yearly, he encroaches on his principal. If the buying all the wood they can get from Canada and elsewhere while holding their own standing spruce as a reserve supply.

To bring this out more clearly, consider what capital a man must possess who wishes an annual income of $425 thereon at 4¼ per cent interest. The answer is, obviously, $10,000. Similarly one can determine what forest capital or growing stock is needed to support the present actual cut of our chief commercial trees. Then, by comparing this with the available growing stock it will appear whether we have a sufficient, an excess or a deficient growing stock.

In New York State, as the figures in the table show, the forest capital, or growing stock, is deficient in all but spruce and balsam and cedar (for reasons already

explained). For all the other main species there is a striking shortage.

If we were to make a generalization from these figures, it would be that, to maintain our present cut in New York State, we need about twice as much standing timber as is available today. Or else our forests must be made twice as productive by the practice of silviculture. The curtailing of our present cut is not desirable; a better solution lies in having *both an* increased growing stock and a greater growth of timber per acre through the application of proper silvicultural methods.

And now we come to the point from which we started. There is a tendency towards decline in the production of forest products in the State of New York. This production is far below the consumption within the State and is far in excess of what the available supplies of standing timber will support. The syllogism is complete: Brutus (dear public) is killing Cæsar. This Cæsar (the forest industry) is bleeding from two wounds—underproduction and over-cutting. Brutus (dear public) is demanding greater production and at the same time more conservative cutting. The conclusion, so far as our imperfect knowledge goes, is that the public must co-operate with the timber producer and grower so that they may fulfill their mutual obligation to maintain the forest industries unimpaired and the forest itself continuously productive.

But that, as Kipling says, is another story.



THE CREW OF AN ADIRONDACK LUMBER CAMP READY TO START FOR WORK

A GRATEFUL ACKNOWLEDGEMENT FROM FRANCE

IN January of this year, presentation of an enormous quantity of forest tree seed was made to France, Belgium and Great Britain by the American Forestry Association, for the rehabilitation of the war-torn forest areas in those countries. The gift was deeply appreciated and the Association is just in receipt of the following letter from France:

Paris, July 5, 1920.

"My dear Mr. President:

"I have the honor to acknowledge receipt of the seeds, the sending of which was announced in your letters of January 19 and March 22, 1920.

"These seeds reached France at the beginning of June in excellent condition.

"I shall be grateful to you if you will act as my interpreter to the American Forestry Association, expressing to them my sincere thanks for their generous decision to co-operate in the rehabilitation of the forests of France which were devastated by the war.

"The seeds which you were kind enough to send will be planted as soon as the season permits in the nurseries of the North, the Aisne, the Ardennes, the Oise, the Vosges, and the Meuse, and the plants from these seeds will be transplanted to the devastated forests in the vicinity of each nursery, at the most interesting points and with due regard for the requirements of each species.

"Seeds of certain species that are little known in France, especially those of the Western Larch, which are to be given special care and study, will be planted in the nursery of the Forest School of Barres, and when the plants from these seeds are large enough they will be sent for planting to those portions of the devastated regions, which appear to be especially suited to them.

"Accept, Sir, the assurance of my highest regard.

Le Conseiller d'Etat,
Director General des Eaux et Forets.
(Signed) Dabat.

"The President, The American Forestry Association, Washington, D. C."

THE FORESTS OF A NEW REPUBLIC

BY E. F. PRANTNER, EDITOR, CZECHOSLOVAK REVIEW

FORESTRY in the new Czechoslovak Republic is receiving the serious attention its importance as an economic factor warrants. About 12,500,000 acres are given over to forest cultivation, or, in other words, approximately 30 per cent of the republic's whole area of over 55,000 square miles. The proportion of the forests differ in the various sections—Moravia boasts of 28.6 per cent, Bohemia has 29.6 per cent, Slovakia shows 34.5 per cent, and Silesia leads with 34.8 per cent.

It is significant that of late years forests have decreased throughout the world to an appreciable extent. Nevertheless,



FOREST AND FARM

Between forest areas are numerous stretches of farm land, well cultivated by thrifty, intelligent farmers.



WELL FORESTED HILLS

Pines and firs cover most of the land in Bohemia, while in Slovakia and Carpathia the leaf forests prevail.

noteworthy that the leaf forests prevail, forming about 67 per cent of the whole, and the needle forests make up the balance, or 33 per cent. Ownership of these forests is singular. The state owns about 1,400,000 acres, charitable institutions own 600,000 acres, municipalities hold 2,500,000 acres and the large estates, held by private owners, cover 8,000,000 acres. It must not be taken for granted that the extensive Czechoslovak forests were given over to the uses of the whole people. On the contrary, all the bene-

the territories now comprising the Czechoslovak Republic, during the period 1875-1910, added no less than 170,000 acres of forests to their forest domains, or about 1,375 acres per year.

During the war considerable lumbering was done in Czechoslovak forests, but not to the extent of materially reducing the whole or impairing their usefulness.

In the Bohemian lands (Bohemia, Moravia and Silesia) the needle forests predominate. The pines and firs cover 78 per cent of the forest area, the leaf timber 9.1 per cent, and the mixed about 12.9 per cent. In Slovakia and Carpathian Russia, the new territories, it is



MUNICIPAL FOREST LANDS

In many cases the municipalities of Slovakia materially reduce or entirely abolish taxation by profitable lumbering operations on their holdings.



A WINTER SCENE LIKE FAIRYLAND

Forest in Bohemia covered with a heavy snow would, if more conveniently located, attract thousands of curious tourists.

fits to be derived enured to the foreign nobility and the wealthy owners, when the mere walking through one of these private forests was presumptive evidence of a wrongful intent. Of the vast estates held by individuals about 64.35 per cent of the whole in Bohemia, were owned in parcels larger than 1,250 acres in extent, while minor holdings, those less than 1,250 acres in area were held by the poorer classes.

A slightly different condition prevails in Slovakia. Here the state owns about 750,000 acres, municipalities hold 2,000,000 acres, and private owners have 2,250,000 acres. This is the entire forest area of Slovakia, comprising about 5,000,000 acres. In many instances the municipalities of Slovakia were enabled to materially reduce or totally abolish direct taxation through lumbering operations on their holdings.

A novel feature of Czechoslovak forest development is the principle that the annual growth must equal or exceed the annual cut. This is a wise and far-sighted policy. It is estimated that 6,600,000 cubic meters of fire wood and 9,400,000 cubic meters of commercial timber are cut yearly. The quantity used for fuel during and since the war will be greatly reduced, in the very near future, through stimulated production of bituminous coal, lignite and oil. At the prevailing prices for lumber competent authorities estimate the value of the annual timber cut to be about $120,000,000.



TREES AND NOT ICEBERGS

This might readily be taken for a photograph of ice hummocks in the Polar region, but it readily is a group of trees in Czechoslovakia, covered with snow.



STARK SENTINELS ON THE BORDERLAND

Like soldiers on guard, the trees stand vigilant on the borders of the new European Republic, Czechoslovakia.

The policy now pursued in lumbering operations is to allow the cutting of only mature timber. On the other hand it restricts the cutting of timber to such quantities as are added to standing timber. That is, if the increase in standing timber in a given year amounts to 20,000,000 cubic meters, then the cut for that year may be about the same quantity. If it is more or less the cut must correspond.

It is well to point out some of the main features of the laws governing the





SNOW PICTURES IN A FOREST IN CZECHOSLOVAKIA

Before the world war, the foreign nobility and wealthy owners of these forests considered that the mere walking of unauthorized persons through these forests was presumptive evidence of a wrongful intent and provided punishment accordingly.



THE BLACK MARKINGS ON THIS MAP SHOW THE FORESTS AND WOODS OF CZECHOSLOVAKIA

About thirty per cent of the new European Republic, or some 12,500,000 acres are given over to forest cultivation. The ownership is divided among individuals, municipalities, charitable institutions and the government.

Czechoslovak forests. Without official sanction, no soil once used for forest purposes may be used for any other; all lumbered areas must be reforested within five years; no forest may be wilfully destroyed, or cut in such a way as to impair its usefulness for forest purposes. Regarding fire protection, the laws further provide that owners must maintain efficient and sufficient number of trained foresters and wardens; an acceptable number of fire prevention devices, provisions for the extermination of injurious insects, and against trespassing.

While nearly all of these regulations were enacted before the present republic came into existence, the more important provisions have been adopted by the present government. However, the Czechoslovak people are awake to the importance and economic necessity of maintaining their forests on such a plane as will yield the best results. So that one of their most precious possessions, the forest, may be properly safeguarded, a commission headed by Dr. Charles Siman, Chief Forester, is now engaged in codifying the forest laws which are expected to be second to none. This commission is also framing regulations for the intensive development of forests to assure a sufficient timber supply for the future. Czechoslovak forests are supervised by the Bureau of Forestry, which is a part of the Department of Agriculture. All forests are subject to the authority of this agency. It is also proposed that all forest estates over 1,250 acres in extent shall become a part of the public domain and be scientifically cultivated and cut.

It must not be assumed that forestry is taken lightly by the Czechoslovak people. Their woodworking industries are dependent upon domestic woods. Therefore, numerous schools for the proper education of foresters and training assistants were established. The College of Forestry is in Prague. This is a post-graduate institution which receives students who have graduated from the forestry high schools. The high schools are conveniently located in Zakupech (Bohemia), Hranice (Moravia), and Stavnici (Slovakia). Elementary forestry schools are found at Pisek, Cheb and Budweis (Bohemia), Jennice (Moravia), and Liptova Hradek (Slovakia). These are state institutions but numerous private schools are also found. In the high and elementary schools courses of one year are provided for men in practical forestry. Thus the country is constantly educating its youth in forest cultivation. With them it is a serious business and profession. They devote their lives to it, their industries are dependent upon it, and they see to it that future generations are abundantly provided with one of our most necessary necessities—timber.



A FORESTERS HOME IN BOHEMIA

Cutting of only mature timber is allowed, and the cut must equal only the amount of new growth and no soil once used for forest purposes may be used otherwise except by government sanction.

FIRE PREVENTION SLOGANS FOR SMOKERS

Don't drop FIRE when you smoke in the woods, nor throw it out along the road. Keep the forests GREEN!

DANGER! Matches, pipe coals, cigar stubs, and cigarette ends start many forest fires. Help protect woods, streams, scenery.

DON'T START WHAT YOU CAN'T STOP! Be careful with fire in and near the forest.

FIRE IS DANGEROUS! Be careful when you smoke in the woods.

LOOK OUT! When you smoke in the woods, don't start a forest fire.

BE CAREFUL! Don't start a fire in the woods when you begin or end your smoke! Be sure your match, cigarette or pipe is out.

YOUR CO-OPERATION in order to keep down forest fires is asked. Break your match in two. Knock out your pipe ashes into your hand. Don't drop a burning cigarette.

FOREST FIRES cost millions a year. Don't start one.

DON'T THROW FIRE AWAY in the woods or along the road.

HELP PREVENT FIRES

FIRE PROTECTION AND MORE PUBLIC FOREST LAND

BY CHARLES LATHROP PACK

[Extracts from an address by Charles Lathrop Pack, president of the American Forestry Association, at the annual forestry conference of the Society for the Protection of New Hampshire Forests, New London, New Hampshire, August 24, 1920.]

"ONE year ago at a forestry conference, at Bethlehem, New Hampshire, I had the pleasure of speaking on a national forest policy. I recall that I made a statement that we all believed a national forest policy was absolutely necessary but that many of us differed regarding detail. I said that in my humble belief one of the first essentials was an adequate fire protection program and I advocated getting together on the subject of fire protection and seeing what could be accomplished in that direction as a first step. To my surprise a good friend, one of the leading professional foresters of the United States, intimated afterward that I was not in favor of a forest policy because I advocated only fire protection.

"A year's discussion and sober thought has, I believe, convinced foresters generally that a very large percentage of a national forest program is fire protection, and it is my earnest hope that Congress will, before long, pass legislation making it possible for the Government to co-operate with the States in fire protective work of a character and extent adequate to our practical needs. When that is done the first great step toward a national forest policy will have been achieved.

"Nearly ten years have elapsed since the passage by Congress of the so-called Weeks Law, providing for the purchase by the Federal Government of forest lands on the watersheds of navigable streams and for the financial co-operation of the Federal Government with the individual States in the protection from fire of such watersheds. The American Forestry Association and the Society for the Protection of New Hampshire forests were largely instrumental in securing the passage of this legislation, which marks one of the most important milestones in the progress of this country toward the protection and perpetuation of its forest resources. We are now on the threshold of still greater developments, in which I take it for granted that all of us wish to play an equally important part.

"During the past few years the necessity for forest conservation, both for our safety in time of war and for our well-being in time of peace, has been more forcibly impressed on the people of the country than ever before. As a result the movement for the adoption of a thoroughly comprehensive, nation-wide forest policy has gathered such momentum that we have passed the point where it is sufficient to discuss the problem in glittering generalities. We have at last reached the stage where it is appropriate to discuss the specific legislation necessary to accomplish our purposes. In the recent report made by the Forest Service on timber depletion and related subjects known as the 'Capper Report,' concrete suggestions were made regarding the Federal legislation needed in the immediate future. The two first and most important of these deal with forest fire protection and the expansion of Federal forest holdings. The need for legislation along these lines has been further emphasized by the Chief Forester, Colonel W. B. Greeley, in recent addresses, and I wish to invite your consideration of them today for a few moments.

"It is worth noting that both of these points are covered in the original Weeks Law of March 1, 1911, so that in a way what we are seeking today is merely an expansion of that fundamental legislation. What we need now is to broaden its scope and increase the appropriations provided under it. The current appropriation for the Forest Service carries $125,000 for co-operation by the Federal Government with States in the protection from fire of forest lands on watersheds of navigable streams. This amount should be increased to an annual appropriation of at least $1,000,000 and the provision restricting its use to watersheds of navigable streams should be eliminated. Authorization should also be granted for the use of the fund to work out the most effective methods of handling various classes of timber land and to conduct such other investigative and extension activities as the Forest Service might find it desirable to undertake in co-operation with any of the States. With an appropriation of this size and with authority to expend it wherever and however it is most needed, we should be able to make real progress in perpetuating the forests by protecting them from their most deadly enemy—fire.

"I do not need to argue the necessity of such an appropriation before a gathering of this sort. You know as well as I that our mature forests are not only being wiped out by destructive conflagrations and by smaller but none the less destructive fires, but that the reforestation of cut-over lands is being prevented by these fires and hundreds of thousands of acres of land which should be producing valuable timber are being converted each year into desolate wastes. We are told by the Forest Service that according to the latest information available there are 81,000,000 acres of forest land, nearly one-fifth of the total forest area of the country, on which there is little or no forest growth of any value. This enormous area of waste land is equivalent to the combined area forests of Germany, Denmark, Holland, Belgium, France, Switzerland, Spain, and Portugal.

"Our standing timber is being cut and destroyed by fire, diseases and insects, more than four times as fast as new timber is being grown. In the case of sawtimber alone the destruction is more than five and one-half times the growth of such material. What this means to the nation in the way of higher prices for forest products and of unstable industrial development following the cutting out of first one region and then another, is too obvious to require repetition. You are

all familiar with the old story of local timber depletion and the depressing influence which it exercises on the economic and industrial life of the entire region. I am not an alarmist, but I should fail to perform my plain duty as President of the American Forestry Association were I not to tell you frankly that we shall in no remote future find ourselves in a decidedly uncomfortable, not to say critical, situation unless we put our idle forest lands to work.

"The pity of it all is that our present failure to perpetuate our forests is so unnecessary. We have ample areas of lands not better suited for other purposes to make ourselves indefinitely self-supporting in the matter of our requirements for forest products. All that we need is to handle them properly. Many factors, of course, enter into the problem of producing the maximum supply of wood and of utilizing it in such a way as to insure continuity of industry. Questions of taxation, insurance, silviculture, forest management, and wood utilization, are all involved, but more important than any of these in our present stage of development is the problem of fire protection. According to Colonel Greeley, adequate fire protection would solve 75 per cent of the difficulties by which we are now confronted in attempting to keep our forest lands productive. A large part of the other 25 per cent involves the practice of correct silviculture, and it is only reasonable that in co-operating with the States the Forest Service should be authorized to insist, as a basis for financial assistance, upon the passage of State legislation making it possible to require reasonable standards in the methods of cutting and utilizing the forest and of disposing of the slashings, wherever these are important factors in maintaining the productivity of the land.

"Altogether there are some 315,000,000 acres of State and privately-owned forest lands in the protection of which the Federal Government should co-operate. At present more than one-half of this area is almost wholly unprotected, and of the remainder existing protection is to a considerable extent far from adequate. If these lands are to be kept productive there must be a tremendous expansion in our present fire protection activities on the part of all of the three principal agencies concerned—the Federal Government, the States, and the private owners. The first point of expansion is the passage of legislation authorizing the Federal Government to spend a million dollars a year for this and related purposes in co-operation with the individual States. Obviously State legislation along similar lines is essential and should go hand in hand with Federal legislation. Prompt passage of the latter is highly desirable since it would undoubtedly prove the most effective stimulus possible for State action, not only because of the moral effect of a good example, but because such action would be necessary to enable the States to take advantage of the offer of Federal funds to supplement their own appropriations.

"Fire protection should be accompanied by a marked increase in the extent of publicly owned forests. The purchase of lands by the Federal Government which was initiated in 1911 under the Weeks Law should be continued with an annual appropriation of not less than $2,000,000. As in the case of fire protection, present restrictions on the use of this appropriation only on the watersheds of navigable streams should be removed and the Forest Service permitted to purchase other forest lands in cases where this may be advisable. Primary emphasis should, of course be laid on completing the original program for the protection of the watersheds of navigable streams through the acquisition of about one million acres in New England and about five million acres in the Southern Appalachians; but in addition to this the Government should acquire forest lands in all the principal forest regions where areas suitable for Federal management can be obtained. The extension of National holdings in this way is sound public policy because it makes possible the consolidation of existing holdings, because such areas serve as models to be followed by private owners in the management of their lands, and because to a very considerable extent the growing of large-size timber will undoubtedly come to be more and more a public function.

"At present about one-fifth of the forest land of the country is publicly-owned, mainly by the Federal Government. The Chief Forester has expressed himself as in favor of the extension of such ownership until the public owns half of the timber-growing land in the United States well distributed throughout the principal forest regions. Without attempting to pass upon the exact per cent which should eventually be acquired by the public, I think we can all agree that every encouragement should be given to the States and municipalities to acquire forest land and that the Federal Government must take the lead in this respect. It goes without saying that in all Federal acquisition local communities should be equitably compensated in some way for the tax returns of which they are deprived when the Government takes over the land.

"So far the National Forest Reservation Commission has approved for purchase under the Weeks Law nearly 2,000,000 acres of forest land at an expenditure averaging approximately $5.30 per acre. Not only have these lands proved to be a good investment from the standpoint of watershed protection, the primary purpose for which they were acquired, but they have also demonstrated that financially they will be an excellent investment. Moreover, from the broader standpoint of the National welfare as a whole, it must be recognized that under present conditions Government ownership is practically the only effective means for preventing the exhaustion of old growth timber of high quality and for restocking many denuded areas. There is every reason why the program of Government purchases, which has been interrupted by the failure of Congress to appropriate funds for the purpose, should be renewed on a still larger scale than before. Two million dollars a year is certainly a sufficiently modest sum to set aside

in an investment which will not only yield satisfactory returns from the financial standpoint alone, but will materially assist in enabling us to meet indefinitely our own requirements for wood, with the permanency of industrial development which this imples.

"Speaking for the American Forestry Association, I can say without reserve, that the Association is heartily in favor of the prompt enactment of legislation along the lines discussed. I feel confident that your interest in the matter is equally vital and that through the earnest co-operation of all concerned it will prove possible to translate these two foremost measures, which together form the keystone to our national forest policy, from the realm of academic discussion into a program of action based on the solid foundation of legislative enactment."

SPLIT WOOD SECTION REVEALS INITIALS CUT ALMOST A CENTURY AGO

"AT the suggestion of Mr. Alfred Gaskill, State Forester of New Jersey, I enclose a photograph of a section from a beech tree cut along the bank of the Delaware River in January, 1885, which shows a most interesting development," writes Henry T. Moon, of Morrisville, Pennsylvania.

Careful examination and count at the laboratories of the New Jersey Forestry Department shows the growth rings would indicate that the tree was cut in 1886 instead of 1885, but the only record available concerning the section, is taken from a former resident as follows:

"A section of a tree cut from the bank of the Delaware River in Pennsylvania, one mile above Morrisville. The tree was cut in January, 1885, and this piece accidentally split open while being cut into firewood."



Photograph by Grant Castner.

AN INTERESTING SECTION CUT FROM A BEECH ON THE DELAWARE RIVER

The initials were cut, as indicated, many years ago, and were only revealed when the piece split open after the tree was taken down and when it was being cut up for fire wood.

Mr. Gaskill, in commenting on the section, writes as follows: "Our count of the growth rings indicates that the tree was cut in 1886—not 1885, though it is possible that your record is more trustworthy than our count.

"It has been observed that on the opposite side of the section are two other initials which show through the bark. By careful sectioning they might be revealed.

"My suggestion that you publish this material is renewed, because it furnishes the best example I ever saw of the trustworthiness of a record of this kind, as well as the biological fact that in the growth of a tree artificial irregularities determine subsequent development. Careful examination indicates that the initials were cut when the tree was about sixty-seven years old."

The specimen is the property of Mr. Henry T. Moon, Morrisville, Bucks County, Pennsylvania, having been given to him in 1918 by Mrs. Mary W. Ridge on whose property the tree was cut, and who disposed of it when breaking up her home and leaving the farm.

NO SUBSTITUTE FOR HIGH-GRADE WOODS

NO substitute has been found for the high-grade hickory and ash required by handle makers and the vehicle and agricultural implement industries. The supplies came principally from the South where the most accessible supplies have already been cut. So scarce has the supply become that large firms are literally combing the territory to secure material. It is said that five years more will see the end of the supply of the northern upland ash, which is preferred to the swamp-grown variety of the lower Mississippi Valley. The demand for handles is so great that manufacturers can not meet it. Any price necessary for raw material is being paid. Competition with other industries using the same woods, particularly the manufacturers of automobile wheels, is keen. Wholesale prices have more than doubled and retail prices are in about the same proportion. The small handle factory is being gradually eliminated, and there is said to be a steady drift toward the concentration of handle manufacture by large concerns and the disappearance of local industries.

THE COCOA-NUT PALM

THE cocoa-nut palm (*Cocos nucifera*) more properly coco, also mentioned under cacao and chocolate, is one of the most useful trees in the world. It is said by the people whom it furnishes with nearly all the necessaries of life that it has as many uses as there are days in the year; but that seems to be an under estimate; for surely three hundred and sixty-five necessities would never meet the demands of a modern up to date man or woman of the temperate zone. The cocoa-nut palm is a magnificent tree often reaching a height of one hundred feet and crowned with wide-spreading fronds often twenty feet in length. The frond consists of a strong mid-rib which terminates in long slender leaflets, giving the entire frond the appearance of a gigantic feather. Among the massive leaves growing from the main stem is the fruit, usually in clusters of from ten to twenty nuts, from eight to twelve inches in length and from six to eight inches in diameter. This palm is so generally spread over the tropical world that its original habitation is not known. It luxuriates in the sea air, and abounds along the east and west coasts of Southern India. The west coast of Ceylon from Colombo southward for over one hundred miles is a dense wilderness of cocoa-nut palm plantations. The Malay peninsula is fringed with these graceful trees. They are everywhere over both the East and West Indies and tropical America. The huge triangular nuts are water proof, as though made to navigate the seas and reach every shore, which they surely have done, for on every island and coral islet of the Pacific Ocean they are found. They reach their greatest vigor by the sea; on the sea-shore they lean towards the water as though to send their seed adrift for other lands. The spathe or flower case is of a hard woody substance from four to five feet in length, and when this case bursts to release the blossom it is like the report of a gun. I first heard the bursting of cocoa-nut flower cases when hunting in the jungles of the Amazon. I asked my Indian guide if there were other hunters near. Of course he replied: "The bursting of cocoa-nut flower buds." These huge flower cases are tapped at the base for the sweet sap they contain. The sap is boiled down into an excellent sugar; it is fermented into arrack, the apple-jack of the tropics. The flower bursts out in branching spikes five and six feet in length. The flower stalk when dried is used for torches; the leaf stalk for fencing, the leaves for thatch, for



THE UNIQUE BEAUTY OF THE COCOANUT PALM MAY BE FULLY APPRECIATED IN ITS NATIVE HOME, CEYLON, WHERE IT FRINGES A HUNDRED MILES OF SEACOAST

umbrellas, for table ware (plates and other dishes). The nut when green is food and drink; when ripe, its husk yields the coir fibre from which mats, ropes, cordage, brushes and woven coir matting are made. The inner hard shell is made into cups, dippers and other vessels; the kernel is the copra of commerce used in making confections. From it the valuable commercial product called cocoa-nut oil is pressed, and from the oil candles, butter and soap are made. An average yield of a tree is sixty nuts. A thousand nuts will produce five hundred pounds of copra, or twenty-five gallons of oil. The climate of Ceylon is well adapted to all kinds of palms and embraced in her many plantations there are said to be over thirty million trees. The wealth of the Ceylonese is usually estimated by the number of cocoa-nut trees they own. Native boats from the Maldize Islands some-



A COCOANUT PLANTATION PROTECTED AGAINST NUT THIEVES. NOTE THE DRIED FRONDS PLACED ON THE TRUNKS OF THE TREES, WHICH WILL CRACKLE UNDER THE FEET OF THE MOST NIMBLE CLIMBER AND ATTRACT THE ATTENTION OF THE GUARD

times arrive in Ceylon, built, rigged, provisioned and laden with the produce of the cocoa-nut palms. A shipwrecked crew was cast upon the South Sea Islands where the party remained for several months living solely on cocoa-nuts and a little broiled fish; when they returned they had all increased in weight.

The by-product is oil-cake which is of great value. The trunks of the trees are used for innumerable purposes besides house building and furniture, and the wood in Europe is called porcupine wood because of the vascular growth resembling the quills of that animal. Mature cocoa-nuts fall from the trees; but planters cannot always



THE LEAF, BUD, BLOSSOM AND FRUIT OF THE COCOANUT PALM

wait for them to fall, and there is no pole or ladder to reach one hundred feet; climbing is the only way, and cocoa-nut tree climbing is a trade in cocoa-nut countries. Professional tree-climbers have the speed and agility of monkeys. To facilitate the operation they place a strong loop of coir rope around the feet near the ankles; this enables them to grip the tree securely and ascend the highest trees with amazing alacrity. The climbers are also tree tappers, that is, tapping the cocoa-nut bud for the sap from which arrack is made.

Cocoa-nuts being the native wealth, cocoa-nut thieves are not uncommon. The owners of plantations have a unique system of thief alarm: dry fronds are bound to the tree from the ground upwards for about twenty feet; and it is impossible for the thief to remove or climb over these without making a great noise which arouses the watchman who is never far away. There are many other kinds of palm trees in Ceylon of great economic value; next to the cocoa-nut palm comes the palmyra, the value of whose exports alone reach half a million dollars, while those of the cocoa--nut exceed five million dollars, and the export value is but a fraction of the value in the domestic uses. I am referring now to the small island of Ceylon. Marvelous as are the many varied uses of this tree I have yet to dispute its claim to the first place in economics, and that when I consider the bamboo. —*James Ricalton.*

HEART ROT IN WESTERN HEMLOCK

THE United States Department of Agriculture is interested in the conservation of the timber supplies of the country and is urging preventive measures against decay which is prevalent to an alarming extent in the hemlock forests of the west.

"It has been generally supposed," says a bulletin issued recently by the Department, "that lumber from western hemlock is likely to decay rapidly after it has been sawed. Such early decay is usually due to heart rot present in the growing tree before it is cut; its effects are particularly noticed as the lumber dries out, even though there is no progress in the decay itself.

"This heart rot is known to sawmill men as stringy brown rot, and to the woodsmen generally as Indian Paint fungus, mainly because the Indians of the Northwest used to use the powdered orange red fungus for war paint, and also made dyes of it."



A NOVEL SEAT

A LONG WHILE AGO A HUGE MILLSTONE THAT HAD BEEN USED IN A NEW YORK VILLAGE WAS DISCARDED. IT LAY ON THE GROUND FOR MANY YEARS UNTIL ONE DAY A TENDER TREE POKED ITS HEAD THROUGH THE HOLE IN THE CENTER OF THE STONE. THE TREE CONTINUED TO GROW AND SOON FILLED THE HOLE SO TIGHTLY THAT THE MILLSTONE WAS HELD UP BY THE TREE. THIS EFFECT WAS NOT PRODUCED, AS SOME HAVE THOUGHT, BY THE TREE LIFTING THE STONE TO THIS HEIGHT, A THING WHICH IS IMPOSSIBLE WHILE A TREE GROWS. THE STONE HAD BEEN HELD UP HIGH ENOUGH TO SIT ON COMFORTABLY BY OTHER MEANS, AND WHEN THE TREE ONCE HELD IT UP, THE SUPPORTS WERE REMOVED.

THE USES OF WOOD

WOOD FOR MUSICAL INSTRUMENTS

BY HU MAXWELL

KIND WORDS FROM THE MAKER OF THE FAMOUS STEINWAY PIANO

"We desire to become life members of the American Forestry Association and hand you herewith our check for $100.00 in payment of dues.

"As manufacturers in wood products of the highest quality, we feel that you are doing a splendid work towards the preservation of our trees and forests and we sincerely hope that the splendid propaganda that you are making in this good cause will eventually bear good fruits."

WILLIAM R. STEINWAY.

MANUFACTURERS of musical instruments select wood with several objects in view, depending upon the kind of instrument and the particular part of that instrument which the wood is to supply. The maker of one kind may want a wood of extra strength and unusual stiffness in order to give the necessary rigidity. Another may desire a kind that behaves well in joinery and is not inclined to excessive shrinkage and warping. Sometimes a wood is wanted which possesses high resonance. Or, perhaps, the maker of veneers intended for use in the bodies of large musical instruments, looks for a wood for the cores or inner sheets of built-up panels, and he selects one which holds glue well and is not much inclined to warp and check during changing conditions due to heat and moisture.

Beauty of figure or attractive color may be the chief quality sought by the maker of the outer parts of instruments, the portions which are seen and by which many purchasers judge the merit and value of the instrument. If this is the manufacturer's purpose, he is interested in none but beautiful woods and selects those which are most pleasing.

Few industries are more exacting in choice of material, yet many qualities and kinds are employed. Some are rare and costly, others cheap and common, but each has its proper place to fill for the manufacturer of instruments ranging in size and scope from the piano to the harmonica, utilizes something from nearly every part of the forest. One wood may be highly colored and richly figured, another as plain as basswood. Those strong, like maple and birch, are in demand, and next to them such weak species as buckeye and white pine may find a place, and it cannot be justly claimed that the one is more essential than the other. Those which transmit sound and are known as resonant woods, like spruce and southern white cedar, are employed in the same work with dull-sounding woods like oak and gum.



ONE OF AMERICA'S FINEST CABINET WOODS

An ordinary observer would probably pronounce this piano to be of Circassian walnut, so nearly is that wood resembled. It is, however, red gum from the forests of the South. Its grain and figure are so much like those of Circassian walnut that one often passes for the other. Some insist that red gum is America's finest cabinet wood. If not the finest, few surpass it.

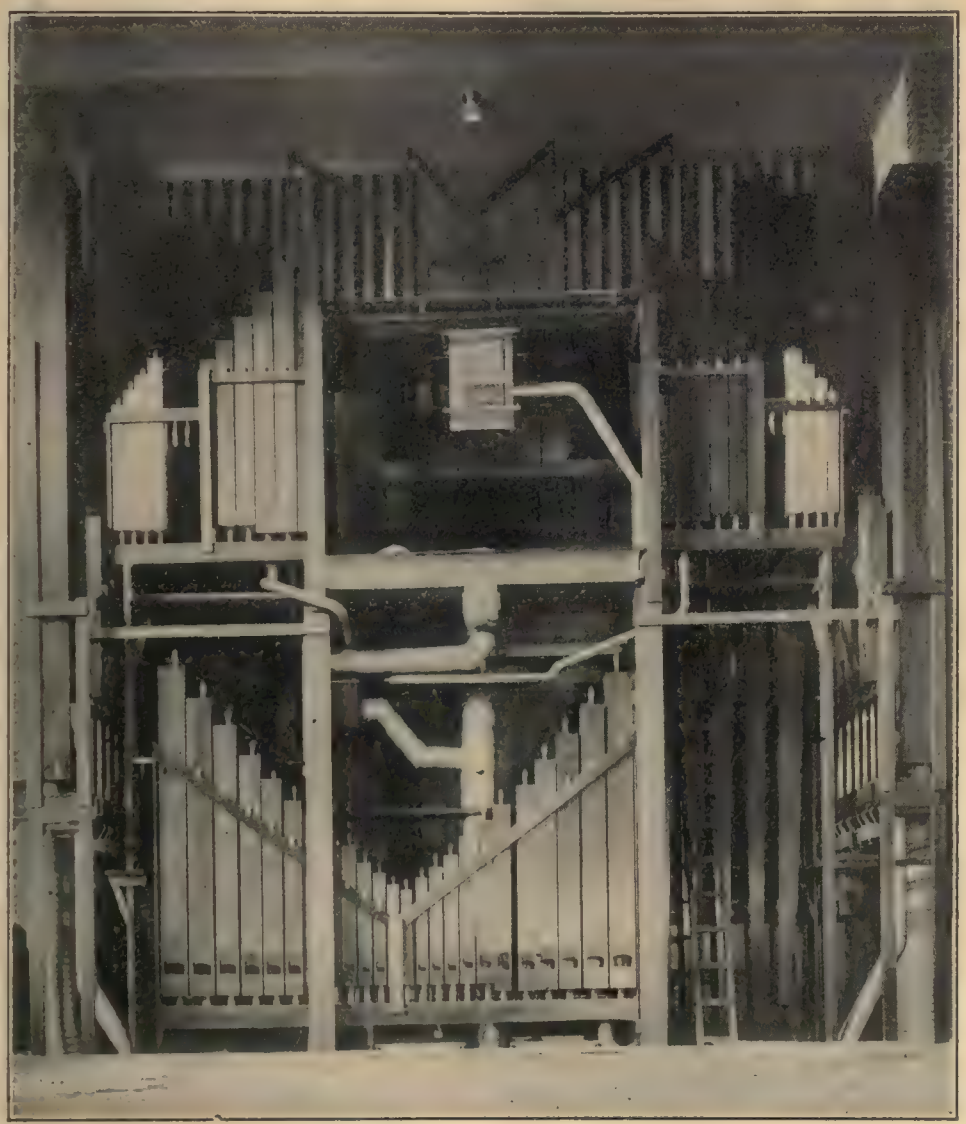
Selection goes much farther even than this in the choice of material for the manufacture of musical instruments. The annual demand by all makers in the United States exceeds 260,000,000 feet, and if all the species were carefully set apart and counted, the number would probably exceed one hundred. In statistics the woods are generally grouped according to

genus rather than species, several being included under one name, as oak, ash, elm, maple, and spruce.

Both softwoods and hardwoods are employed in this industry. Ten of the former are on the list, all of which are native of the United States. Not a foot of imported softwood is used, unless possibly a little spruce from Canada for sounding boards, but none such is shown by the records. The total annual demand for softwoods exceeds 43,000,000 feet, as follows:

Spruce, 29,144,150; white pine, 9,394,820; yellow pine, 2,107,994; sugar pine, 1,004,400; hemlock, 615,600; Douglas fir, 480,400; redwood, 286,200; balsam fir, 101,400; cypress, 70,000; Cedar, 17,500, total, 43,222,464 feet.

In quantity spruce exceeds the other softwoods in the above list. Though it is named as though it were a single species, several spruces are included in the group, the principal being the eastern red spruce that grows from the mountains of West Virginia to northern Maine, the largest supply coming from the two states named; and Sitka spruce of the northern Pacific coast. Some spruce of the black and the white species, from New England and the Lake States, and from the adjacent regions of Canada, contribute to the musical instrument industry, the total spruce exceeding 29,000,000 feet annually.



THE INTERIOR OF A PIPE ORGAN

This view behind the scene is in the First Universalist Church in Detroit, Michigan. The fine organ is constructed wholly of California redwood. It is a rather new material for large musical instruments, and it has been selected because of the well-known unshrinkable qualities of redwood. In that respect it compares with mahogany.

The value of spruce in this industry is due chiefly to its resonant qualities. It is a musical wood. Peculiarities of growth make it so. It takes up and transmits vibrations more perfectly than any other wood that can be had in adequate quantities.

The scientific explanations of spruce resonance have not all been alike, neither are they all consistent. Agreement is pretty general, however, that the cause lies in the wood's long fibers and in their uniform and regular arrangement. The fibers vibrate like so many taut cords. Comparison might be made to a group of tightly-stretched strings, parallel and of equal length, each vibrating free from interference by the others, and all in unison, having been acted upon by the same impulse. Wood consists of fibers which may be compared to strings either parallel or interlaced. The most of those of spruce are parallel, hence their fine musical qualities. Most other woods have shorter fibers and they may not be arranged so that they can vibrate freely, one interfering with another. Oak is a wood of that kind, and it is very poor material for sounding boards for pianos.

Apparatus has been used to test and determine the vibratory qualities of wood, and formulas and equations involving higher mathematics have been worked out to express values; but no scientific process has found out much more than has been ascertained by simple experiments with different woods by practical makers of musical instruments. When Philadelphia was a village of small houses and wooden roofs, Gottlieb Mittelberger listened to the patter of the rain on the thin roofs of white cedar shingles and from the tones thus produced, he worked out the invention of the cedar pipes for his organ. He declared the musical sounds of that wood superior to those emitted by metal.

The most highly specialized use of wood, due to its resonance, is found in the piano sounding board. The finest spruce goes there, though occasionally other woods

have held the place. Southern white cedar was once more popular than spruce as sounding boards, but it is not so now.

The piano is not the only musical instrument which profits by the resonance of wood. The pipe organ does it, but probably not so much as formerly. Most pipes are now made of metal. The quality of wood in a violin has much to do in determining the value of the instrument. The old master makers of violins, like Stradivari, Amati, and Guarneri, selected their wood and prepared it with as much care as they bestowed on the actual shaping and joining. Maple has always been one of the finest violin woods, and it is nearly always combined with some softwood like pine or spruce.

Some of the finest working in wood is done in producing high class horns for talking machines and music boxes. The horn is a sort of sounding board, corresponding to that of the piano. There are very fine instruments which are made without wooden horns, but many persons claim that the wooden horn gives a softness and richness of the tone which is extremely rare.

The xylophone is a small musical instrument which does not rank very high in science or art. Its name is a combination of two Greek words meaning "wood sound." The music which it produces is caused more by the vibrations of wood than is the case with most musical instruments which utilize the resonant qualities of that material. In most of them the sound is transmitted to the wood from some other medium, and is taken up and increased or purified, and is then passed on; but in the xylophone, short rods of wood, graduated as to length, are struck with a hammer, or in some other way are made to vibrate, and the tones are the result. Rods of different lengths are arranged to produce different tones. The manufacturer's success with this instrument, as with most others where the resonance of wood has an important function to perform, depends upon the care with which the wood for the rods are selected, shaped, seasoned, and mounted.

Formerly some very large bells were not provided with clappers to strike in the usual way, but as a substitute, beams of wood were swung on the outside, so geared as to strike the bells, end on, and produce the sound. It is not quite certain how much of the sound came from the beam and how much from the bellmetal; but the metal perhaps deserves most credit though the



A PIPE ORGAN BUILT OF RED GUM

The cabinet work of this fine instrument is of red gum, with little effort to display figured wood. Gum lends itself well to large panels and pilasters. Such are usually built up of veneer, with gum as the visible part. The wood's tone is brownish, and it is one of the handsomest in this country.



of the bell. Such apparatus is said not to be used outside of China at the present time.

Most softwoods listed in this industry do not owe their place to their resonance. For instance, much white pine and sugar pine are manufactured into keys for organs and pianos, but they are preferred for those places on account of their lightness and small tendency to warp, and not for any quality of resonance which they may possess. Such softwoods as hemlock, Douglas fir, yellow pine, and cypress are demanded for the frames of large instruments to give the necessary strength without too much weight or at too great a cost; but these woods hold places in this industry other than as frame stock.

Hardwoods constitute eighty per cent of all the material furnished by forests to the manufacturers of musical instruments in this country. That figure alone tells the story of the importance of this class of woods along the line indicated. Measured in feet, there is much more softwood in the United States than hardwood—five or six times as much. But in kinds or species, hardwoods are far more numerous than the others. Manufacturers engaged in the industry under discussion use not only more kinds of hardwoods but a larger kind of wood and the shape of the beam were carefully looked after as if they had much to do with the success quantity. Five feet of hardwood go to these manufacturers to one foot of softwood. The list follows:

Native Hardwood	*Feet Used Yearly*
Maple	45,482,775
Yellow poplar	40,371,925
Chestnut	38,125,141
Oak	20,638,480
Elm	15,602,440
Birch	12,349,055
Basswood	10,968,180
Red gum	9,243,825
Black walnut	4,991,808
Beech	4,186,000
Ash	2,377,332
Cottonwood	2,351,000
Tupelo	460,000
Cherry	334,180
Sycamore	304,600
Butternut	98,100
Buckeye	6,000
Holly	3,580
Hickory	225
Total	207,894,636

Maple leads all others. It is not because this wood has some special use which accounts for the large demand, but it is due to the general fitness of maple for many parts of musical instruments. Most of its qualities are good ones, and it has many. It fills numerous places and does it well. It is an outside wood for show and an inside wood for strength. It is hard, strong, stiff, heavy, elastic, and handsome. Its chief place is for frames and braces, and its hardness opens the way for its employment as piano actions. A single piano does not require much wood for actions, but in the aggregate a large



Courtesy C. Bruno and Sons.

GREAT CARE MUST BE EXERCISED IN THE SELECTION OF WOOD FOR VIOLINS

The quality of wood in a violin has much to do in establishing the value of the instrument. The old masters selected their wood and prepared it with as much loving care as they bestowed on the actual shaping and joining.



amount is so used in the course of a year in the whole United States. It cannot be stated how much of the forty-five million feet of maple reported in the industry is converted into actions, but the amount is large. Where beauty is the chief consideration, maple meets the call. The figured wood, commonly known as birdseye, is well known and in wide use. This is not a separate species of maple, for birdseye occurs in all the species of that tree, of which there are several. Most birdseye is cut from the tree known as sugar maple, that from which maple sugar is made. No means exist for determining how much of the maple going into this industry is hard and how much soft, but it is certain that hard maple is used in much greater quantities than the soft. Most hard maple is cut from the common sugar tree.



Yellow poplar stands second on the list, judged by the amount used in the industry. It is known as whitewood in some of the northern states, and an attempt has been made to fix on it the name "tulipwood." The name is nice enough, and from the point of view of the botanist it is appropriate, but the public has not taken kindly to this name for the wood, though a little more progress has been made in giving that name to the tree in the woods, and particularly in city parks. An equally unsuccessful attempt has been made to fix on it the name "canarywood," in consideration of its yellow color; but that effort has come principally from lumber dealers in Europe. It is a wood of general utility, like maple, and that explains the extensive use made of it. It is suitable for some part of nearly every musical instrument made of wood. It meets general demand and peculiar uses. It is excellent for cabinet work where closely-fitting joints are wanted. It takes a smooth, fine finish, and along that line it has few equals. Highest grade panels may be made of yellow poplar. The casual observer might not recognize the panels as being of this wood, but might suppose them to be cherry, rosewood, or ebony. It is successfully employed in imitating other woods. So smoothly may it be polished, and so perfectly does it take stains, that the finisher can put a cherry, ebony, or any one of many other finishes on it. Poplar has no distinctive grain of its own, and it is not necessary to cover up and conceal anything of that kind when trying to imitate some other wood.



BLACK WALNUT DRUM

Various woods are used by drum manufacturers for the shells and hoops, among them being walnut, maple, mahogany, and rosewood. For a combination of lightness, strength, and resonance, wood is unexcelled. (*Photograph by Leedy Manufacturing Company, Indianapolis, Indiana.*)

Chestnut fills a much larger place in



Courtesy C. Bruno and Son.



MUSIC MACHINES ON WHICH FINE WOODS ARE USED

Sizes and styles of talking and playing machines are nearly innumerable; but no matter what the size and cost, wood is the essential material of which the cases are made. Numerous woods are used, but most are walnut, mahogany, and oak, though others are occasionally seen, both foreign and domestic.

this industry than most people suppose. Not much of it is seen in the finished articles, probably not one foot in ten. It has a grain and figure so distinctive and bold that their concealment by paints, stains, and varnishes is seldom attempted. It is the opposite of yellow poplar in that respect. The reason why chestnut is so seldom seen in musical instruments, though so often present, is that its largest use is for cores or the concealed, inner parts of veneer panels. The surface of such panels is of other woods, but the bulk is chestnut, covered and out of sight. White pine ranks with chestnut in that use—core of panels. Yet core stock is not the only place filled by chestnut in the musical instrument industry. It is a figured wood and is employed for visible as well as concealed parts. Its figure is formed by the annual growth rings, as is the common figure of ash and yellow pine. We have only one species of chestnut and only one of yellow poplar in this country.



AN ELABORATE PHONOGRAPH

The woodworker is at his best when he makes the cases of high-grade phonographs. The instrument shown in the above illustration is valued at six thousand dollars, a considerable part of which value is represented by the carving on the wooden case. (*Photograph by courtesy of the Edison Company.*)

Other figured domestic woods reported in this industry, in addition to chestnut and birdseye maple, are oak, red gum, black walnut, ash, and sycamore. Perhaps birch should be included, though figured birch is rather uncommon. Native woods listed in this industry, but which have little figure, are elm, basswood, beech, cottonwood, tupelo, and cherry.

The native figured woods most often seen are oak, red gum, and walnut. Oak has a figure due to yearly growth rings, and another due to medullary rays, exposed and brought into view by quarter sawing. These two kinds of oak are known to the trade as "plain" and "quartered." Both figures are popular with musical instrument makers and sometimes one and sometimes the other is the fashion leader.

Black walnut's figure is by many considered the handsomest of all native woods. Yearly rings of growth contribute much to this figure, but the most delicate and artistic of the figures characteristic of walnut is independent of growth rings and is due to pigments in the fibers of the wood, dispersed in wavy lines, or in clouded areas, or in somewhat irregular patterns. Contrast in the black and brown tones in the different areas is responsible for this figure. Other woods possess it in part, but none other of our native woods equals walnut in delicacy of this figure. Red gum is the nearest approach to walnut, but its colors are of lighter tone and the rings of growth are less prominent.

Manufacturers of musical instruments go ahead of nearly all other workers in wood in making the most of figured woods. Furniture makers are scarcely their equals in that respect.

Woods of fine color hold an influential place in the shops of those who make musical instruments. Such woods may display little figure or none. Their value is due to color. One of these is rosewood. Though this wood when freshly cut has the odor of roses, hence the name, that is of no consideration with those who use the material, because the odor has all departed long before the article made of the wood has reached the hands of the final purchaser. But the color remains. Much mahogany is valued for its color rather than its

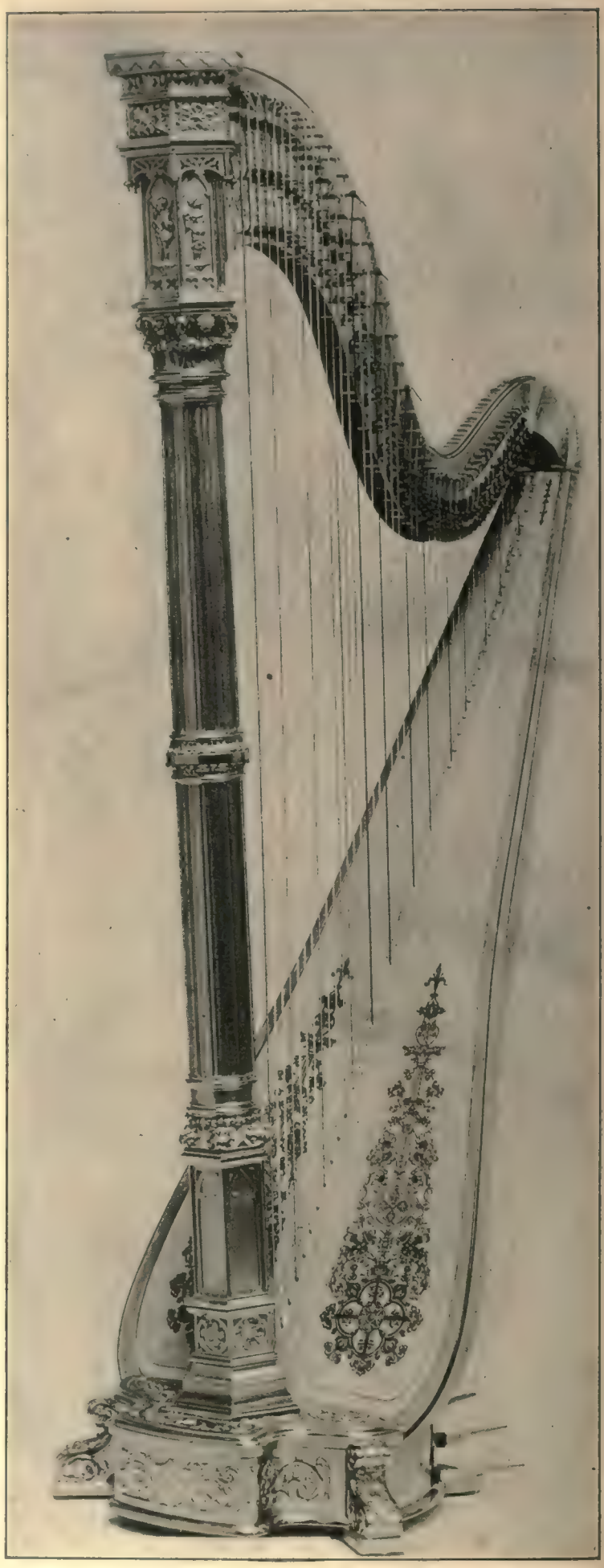
figure. Ebony is another such wood. It usually has no figure, but it may be had in tones ranging from black to green, and in many shades between black and nearly white. Persimmon is ebony's nearest relative in this country, but its wood seldom has color enough to be valuable solely on account of it. Ebony is esteemed on account of its great strength and exceeding hardness, but if it is used by American musical instrument makers, it is listed under some other name, perhaps as ebony.

Prima vera is often called white mahogany, though it is not closely related to mahogany. Its grain suggests the name. The tree grows near the western coast of southern Mexico and further south, and it has not been long on the market. It is remarkable that the wood was offered for sale in lumber yards in San Francisco and Cincinnati before the existence of the tree was known to botanists. In color the wood resembles the yellow heartwood of the evergreen magnolia, the wood of which has recently appeared in markets as "golden mahogany of Louisiana." It is believed that several woods are marketed as prima vera which are botanically different.

Furniture and musical instrument people value Spanish cedar more on account of its pale red color than for the slight figure it possesses. Cigar box makers like it for the odor it has, but that has nothing to do with its use elsewhere. The wood is very soft. It comes from Mexico and the West Indies, and it may be had in amounts as large as wanted.

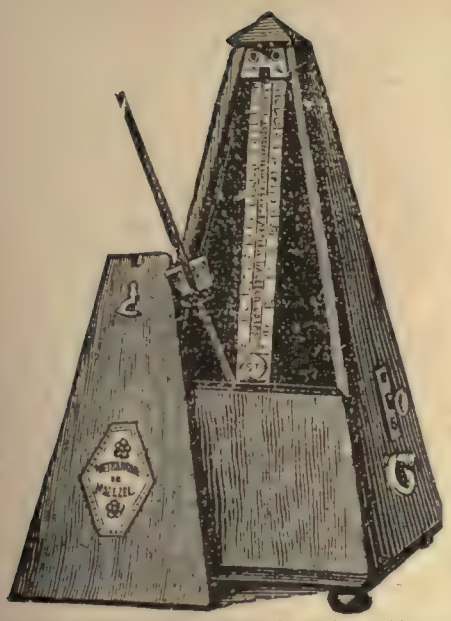
Satinwood's yellow or brown color is responsible for most of its value. Several species from America, Africa, and India are known as satinwood, but perhaps the only one entering into the musical instrument industry is the tree from the West Indies. In the Bahamas it is known as yellow wood. Its book name is *Xanthoxylum flavum*.

The United States produces a number of finely colored woods which are employed in this industry to a greater or less extent. In quantity birch leads



WOOD AND GOLD

The harp maker has carried the use of wood to the highest perfection. The sounding board and sounding body are of spruce and maple, the rest of the instrument being of metal. The metal parts of the harp shown here are overlaid with gold, the instrument being valued at $10,000. This illustration was made particularly large so that the beautiful detail work in the design might be seen to better advantage. In selecting the spruce and maple for such a costly instrument as this, much material of high grade must be rejected because only the most perfect wood can be used. (*Photograph by courtesy of The Rudolph Wurlitzer Company, Cincinnati, Ohio.*)



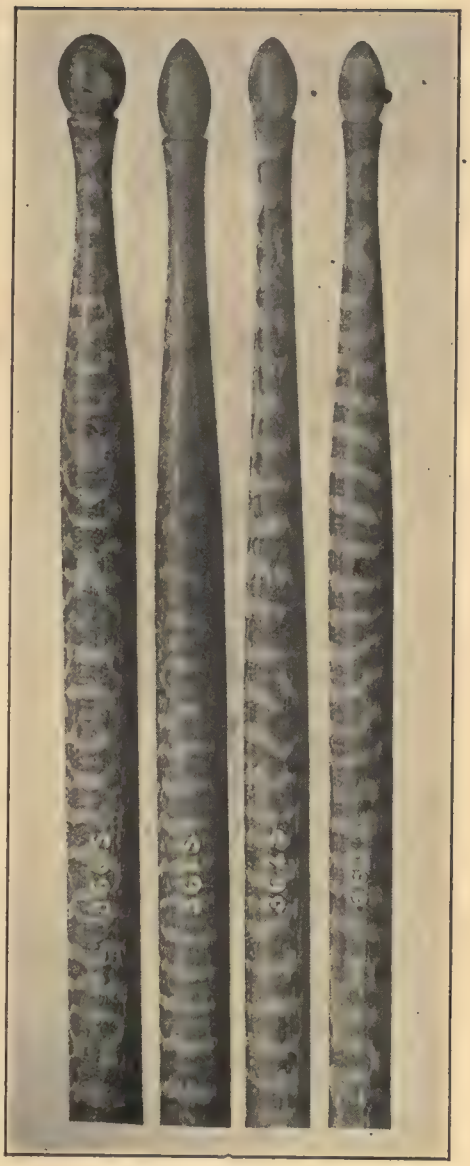
THE LITTLE METRONOME'S IMPORTANCE

Size is not necessarily a criterion of importance. The metronome is a very small instrument, and by it the musician measures his time. It is usually made of cherry, walnut, mahogany or rosewood, and it is seldom or never made of any material except wood, but no great amount is required in its manufacture.



TAMBOURINE WITH WOODEN SHELL

Black walnut holds the place of honor in the manufacture of this artistic musical instrument, which might be classed as a little brother of the drum. (*Engraved from a photograph by the Leedy Manufacturing Company, Indianapolis, Indiana.*)



DRUMSTICKS OF TROPICAL WOOD.

These drumsticks are of snakewood, so called because of its striped appearance, and for the same reason it is sometimes known as letterwood. It comes from tropical America. (*Photograph by Leedy Manufacturing Company, Indianapolis, Indiana.*)



THE XYLOPHONE

The resonance of wood gives this musical instrument its value and makes it unique. The bars are of Honduras rosewood, worked in sizes and lengths to give off the desired tones when struck. These instruments range from toys up to very fine articles. (*Photograph by Leedy Manufacturing Company, Indianapolis, Indiana.*)

the others. Its reddish heartwood is substituted for cherry and mahogany, particularly in pianos. It does not possess mahogany's grain or figure; but when both woods are finished with fillers and stains, it is often difficult to tell one from the other. Birch is stronger than mahogany and for that reason it may serve as posts and spindles which are exposed to danger of breaking, but the other parts of the instrument may be of mahogany. The use of cherry by musical instrument makers is rather large, and most of it finds a place because of its fine color and delicate luster. It goes into many kinds of instruments, including pianos, organs, and automatic players. The manufacture of the small instrument known as the metronome and used for the measurement of tones or notes, calls for cherry in preference to most other woods. The search of woods suitable for violin bows is active although no large quantity is needed. Some dealers guard as a business secret their source of supply of bow woods. Color, weight, and elasticity are essential. Dealers often sell what they call pernambuco wood for bows, but that name is applied to different woods from different continents.

Rosewood has no figure except in rare instances, but its deep, rich color makes it valuable for certain kinds of musical instruments, especially for broad panels. Were it not so soft, it would doubtless have a much wider use.

THE lumber industry of the United States now has its principal producing center in the Pacific Northwest, where the timber resources are located; it has been predicted that the pulpwood producing center of the future will be in Alaska and the Pacific Northwest, for the same reason.

SECRETARY of Agriculture Meredith believes that the development of the forest and hydro-electric resources of Alaska is a practical means of increasing the supplies of newsprint available for the United States, and therefore eventually lessening the paper shortage, now so acute.

TRAMPS THROUGH THE GULF STATES—II

BY R. W. SHUFELDT, M. D.

(PHOTOGRAPHS FURNISHED BY MRS. K. P. ANDERSON AND BY THE AUTHOR)

WHILE in southern Florida, you will certainly remember having seen specimens of that wonderful plant known as the Spotted Trumpet Leaf—a species related to our Pitcher Plant of the North, and quite as interesting. Botanists recognize it as *Saracenia variolaris*, and not long ago the writer received two magnificent specimens of it, by parcel post, from Mr. F. W. Walker, of Orlando, Florida. Both plants were photographed natural size by the writer, and exhibited at the Biological Society of Washington at one of its April sessions (1920). Subsequently the specimens were accepted at the United States Botanic Gardens, of Washington, D. C., and the Superintendent, Mr. George W. Hess, informed the writer that they had never had examples of the plant there before.



A REMARKABLE PITCHER PLANT FROM FLORIDA

Figure 10. As a group, the pitcher plants of the country stand among the most curious flowers that we have. The spotted Trumpet Leaf of the South; photographed natural size by the author. This is one of the strangest species of this small group. (Reduced one-half.)

Nearly all the parts of the flowers of this species are of a pale grass green, which is likewise the case with the greatly elongated "trumpets" which represent the leaves of the plant. These, at their upper ends, inside and out, are generally spotted in short rows of pale, yellowish white spots, as shown in the illustration (Fig. 10). This latter was made natural size, on a six and a half by eight and a half plate, and shows, in the clearest possible manner, all the parts of the plant, including some of the dark brown and broken stalks of the leaves of the previous year.

In tramping through the wilds of such an elegant sub-tropical country as is represented by our Gulf States, one may very profitably devote a part of the time, after dark in camp, to the collecting and properly preserving for the cabinet at home a number of the beautiful moths that occur there at certain seasons of the year. The Luna Moth shown in Figure 11 is a splendid example of these, and a very favorite one. But then, there is a perfect host of others, some of the species being entirely confined to those parts of the country. Frequently, in the evenings, the camp fire will attract a number of these; and should the explorer remain several days in the same locality in the forest, many moths may be enticed by "sugaring" some of the trees of the vicinity. We now have a number of popular works that inform the collectors of moths and butterflies as to how they should proceed to attract them; how to make the captures, and how to care for the specimens after they are taken. Dr. W. J. Holland's "Moth-Book" and "Butterfly-Book" give all this in great detail, as do various Government publications and the hand-books of popular lepidopterists.

The Sphinxes, or Hawkmoths, form a very large group and a most interesting one, not a few species of which can only be captured in the Gulf States. Among them occurs the Giant Sphinx, which is only a "straggler" in southern Florida and southern Texas; it is of a rich brown color, with a row of orange spots down each side of its body; it may have a spread of at least thirteen and a half centimeters. One will have a prize indeed should one capture a specimen of this species and bring it safely home in good condition; it will surely be the envy of every moth collector in the explorer's list of friends. There are no fewer than five subfamilies of the family of Hawkmoths, which family contains hundreds of different species. Many have a coloration and bizarre markings of extreme beauty, and some of the southern forms are exceedingly rare in collections.

One is sure to meet with the big Tomato Sphinx, and the five-spotted Hawkmoth, while there are numerous related species in Louisiana and Texas.

Many of our larger moths present an elegant array of colors and markings; and unless one has enjoyed opportunities to examine and study these, there are certainly many surprises in store for him. One of the grandest of our moth groups is the Underwing genus (*Catocala*), and

over an hundred species are to be found in the United States, not a few of which are to be taken only in the Gulf States. Some collectors confine themselves entirely to the representatives of this assemblage, and many works have been published about them.

Butterflies are, of course, only taken in the day-time; but what has just been said in regard to the moths applies equally to them, and, it may be said, too, of all other insects.

As has already been stated, Florida is a great State for flowers, and doubtless there are many new species to be collected within her boundaries. Many of those already known are either very curious or else very beautiful, and frequently a species will glory in both of these attributes. Some of the plants, as many know, are carnivorous in habit, capturing and digesting a number of insects. About a year ago, Mr. F. W. Walker sent the writer, from southern Florida, upwards of twenty living specimens of the plant known as Venus' Flytrap. A single plant will measure but a couple of inches across, or about five centimeters, while it does not grow to be more than half that height. Its leaves are reddish and greenish, and more or less sticky, with minute, flexible hairs growing all over their upper surfaces. Each leaf may close up by the two halves folding upon each other, the hinge-line being the mid-rib. Now when some hapless little fly alights upon one of these leaves, it slowly closes up upon him, until the insect is entirely in its grasp; the leaf does not open up again until the insect is not only lifeless, but actually digested, just as though it had been in the stomach of some animal possessing a regular digestive apparatus, such as that of any mammal we may happen to think of when the process of ordinary digestion is being considered.



A FINE SPECIMEN OF THE "LUNA" MOTH

Figure 11. Of all the American moths, no single species is more universally admired or more eagerly collected by the amateur lepidopterist than the "Luna." This is a perfect specimen of a male Luna moth, collected and photographed from life, natural size, by the author. It is of a pale green color, with the edges of the forewings marked with rick brown and tan.

But rich as the flora of the Floridian region is, it has no mean rival in this respect in some parts of Texas. In certain areas the country is rich in grasses, and a most interesting collection of these may be gathered by the explorer. Indeed, one area is extremely rich in these plants, extending as it does from the northwestern part of the State south to the thirty-seventh degree of latitude, and eastward to the one hundred and first meridian of longitude. Along the Rio Grande many species are found that are the same as those that occur in northern Mexico. Coastwise, many elegant trees may be seen and studied, the principal representation being peculiar oaks and hickories, as well as the long and short-leaved pines.

Mesquite bush and scattered live oaks are the principal ones, and in some places the only trees to be seen in the black prairie region. Along the rivers in the valleys we meet with fine pecans, cottonwoods, and more kinds of oaks, while in many places numerous shrubs flourish in great profusion. Various tree and shrub growths are found in other regions, while cacti and yuccas of several species flourish throughout the valley of the Rio Grande. Incidentally, it may be said that there is a large lumber trade in Texas, more particularly in pine timber, the other woods being used only for fuel and fences.

Speaking of the yuccas (Figure 14), in the southern part of the State they lend to the landscape in many places a truly tropical aspect, besides being distinctly picturesque in appearance. Their big flower pannicles are wonderfully showy, and attract many handsome butterflies and some other insects, while small mammals and various snakes, some of them venomous, may hide about their bases where the spiny leaves are dead and directed downwards.

Anyone who has traveled through western Texas becomes familiar with the mesquite tree, or, as it sometimes grows, a shrub. In some places where it may grow to be thirty or forty feet high, it is commonly known as the chaparral. Here it is scrubby and masses into dense clumps, it being the home of that famous bird the "road-runner" or chaparral cock, and other interesting species. This is a form of big, ground cuckoo, that only takes to flight when hard pressed; while on open ground it can run so fast that an ordinary horse cannot keep up

with it. Speaking of mesquite, a writer at hand says of it that "under the action of prairie fires it is reduced to a low shrub, developing then an enormous mass of roots, locally known as *underground forest,* of great value as fuel. The wood is heavy and very hard, almost indestructible in contact with the ground; it is used for the beams and underpinnings of adobe houses, for posts and fencing, for fuel, and for furniture. It is of a brown or red color, handsome when polished, but difficult to work. The bean-like pods, before maturity, become pulpy and exceedingly rich in grape-sugar. They are eaten by the Indians as well as by whites, and furnish a valuable fodder for horses. The shrub also exudes a gum resembling a gum arabic, which in Texas and Mexico is collected in considerable quantities for export."

Along the rivers and streams in some parts of the State, and around the margins of ponds and lakes, we meet with great beds of the Water Hyacinths. Their delicate white flowers and dark green leaves present a picture of floral luxuriousness not easily forgotten (Fig. 12). Where they grow, one should be on the look-out for various species of reptiles or batrachians, and their habits and appearances in nature carefully observed. We know very little about some of the forms, and science will welcome any new facts in regard to them. Some of the frogs and toads, for example, are not only very rare in collections, but we are practically lacking in any field notes upon their exact distribution and habits. Some of the toads found in the neighborhood of Brownsville, for example, have not as yet received any common names. Of these, *Hypopachus cuneus* may be cited, of which Miss Mary C. Dickerson reports in her "Frog-Book:" "The habits and life history are not on record."

Photographs of some of the lovely flowers of Texas have been sent me by Mrs. Kate Peel Anderson, of Brownsville, Texas, and among them a most attractive picture of an *Aristolochia,* which the Texans and others know as the "Duck Vine" for the reason that the unopened flower, on side view, resembles a swimming duck. The richly tinted blossoms, when in full bloom, are delicately dotted all over with irregularly shaped chocolate colored spots, which strongly remind one of some of the flowers of an orchid. Mrs. Anderson seems to believe that the Duck Vine is an "insect eater," and possibly this is so. When the seed-pods mature, each has the appearance of a charming little suspended basket, at the bottom of each of which we find the flat seeds of the plant.

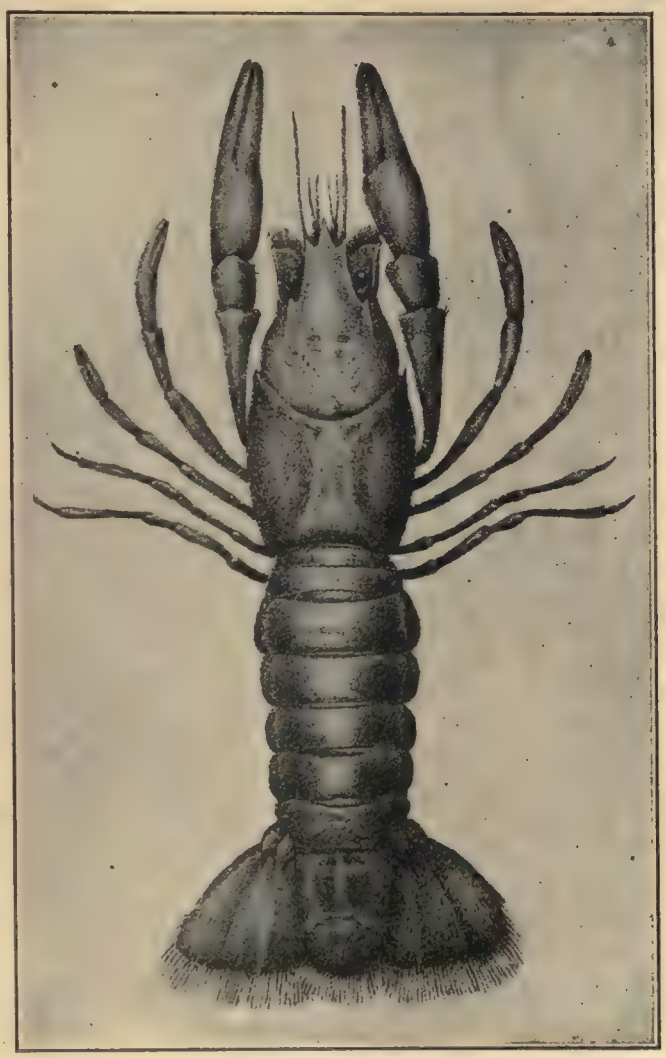


THE BEAUTIFUL WATER HYACINTHS OF TEXAS

Figure 12. In many parts of Texas, the Water Hyacinths grow in the greatest profusion about the borders of lakes and other small inland bodies of water. This beautiful picture of the Water Hyacinths, together with the plants here shown in Figures 14 and 16, were presented to the writer by Mrs. Kate Peel Anderson, of Brownsville, Texas, with permission to use them in the present connection.

Thus we see that while there yet remains a great deal to be examined and desired in the botany and zoology of Florida, Alabama, Mississippi, and Louisiana, the flora and fauna of Texas is even less known—that is, compared with that of some of our New England and Middle States. Now that the country is gradually settling down again, following upon all that was forced on it as a consequence of the great war, it would seem that the

time has arrived when such activities as researches in the various natural sciences and geology should be entered upon by the present generation far more extensively than they are at present. At no time in the history of this Republic has there been a period when so little work of that kind has been initiated, prosecuted, and published. The writer, having been actively and continuously engaged in all departments of biology and various allied activities for considerably more than half a century, feels that he is in a position to make comparisons of the annual achievements in the departments referred to as the years have passed. Owing to the enormously increased use of the airplane and the automobile, the wilder parts of the country are being overrun by thousands of people who never contemplated visiting such regions before. Altogether too many of these are destructive to animal and plant life, and absolutely heedless as to using the material for any purpose whatever. All this can but work to one end—and that is to extermination. In some instances this will be rapid, and gradual in others. The larger animals and the most conspicuous plants will disappear first, but the fate of all will be the same. Climate and inaccessibility will protect some regions for a greater length of time than others; but even these will soon cease to constitute barriers, and the inevitable outcome will be the same.



A RESIDENT OF THE GULF STATES

Figure 13. Shufeldt's Crayfish (*Cambarus shufeldti*), discovered in Alabama by the writer, figured and described by Professor Walter Faxon, of Harvard University. Explorers in the Gulf States are quite likely to meet with either animals or plants heretofore unknown to science, and such discoveries are often important.

What has already happened in Florida is, perhaps, not so evident in the case of the other Gulf States; but to a degree it is also true of them. Young naturalist-explorers should ever bear all this in mind; and in making their field notes upon plants and animals of the region here being considered, it is always well to make a record of any observation that is likely to be of any value to the naturalists of the years to come. This duty is only too often neglected; it is by no means an uncommon thing to hear of a person enjoying unusual facilities and opportunities as he passed through some comparatively unknown region, arriving at the end of his journey with a comparatively blank field note-book, whereas it ought to have been filled from cover to cover with such observations as he was enabled to make from day to day on the expedition.

So important is this subject that entire books have been devoted to it, and one of the best of these is a volume of over 500 pages, published in London in 1861, being a revision by Dr. Norton Shaw of the late Colonel J. R. Jackson's volume, entitled "What to Observe or The Traveller's Remembrancer." Colonel Jackson was a Fellow of the Royal Society. It is pointed out in the preface that "the work is intended for general use, and will be found serviceable alike to those who travel luxuriously over civilized Europe or America, and to the adventurous and undaunted spirits who, in all climates, are content to have obstacles and endure hardships in search of Knowledge."

This is the very kind of book that should be studied by the one contemplating an expedition through the wild and least known sections of the Gulf States. So thorough and extensive is the treatment of the subject in it, that it is quite out of the question to review all that it touches upon. It may be noted, however, that Section III is devoted to the "Animal productions or Zoology of a Country;" and the author, in about twenty pages, goes most thoroughly into the question as to what the explorer should make record of along the lines indicated.

Every working naturalist in this country, and no end of them abroad, is familiar with certain nature text-books—wonderful sets of books, carrying hundreds of plain and colored plates and text-cuts. These volumes take into consideration all the main groups of animals, trees and plants, shells, fungi, and other subjects. But a few groups are still left for treatment, the most conspicuous ommissions being the salamanders, the coleoptera among insects, and some others.

Now, when one comes to study any of these books—about plants, fish, reptiles, batrachians, birds, and mammals, it makes little difference which volume you choose—it is soon evident that, with respect to the plants and

animals of the northern and middle States, the information imparted is more or less full and satisfactory; but as soon as we get into the flora and fauna of the Gulf States, and take up the indigenous species of that region, it becomes at once plain that there are many gaps in our material in collections, and a far more evident lack of knowledge of the biology—using that term in its broadest sense—of nearly all the forms of the extreme southern parts of the country. Let us have an example or so to illustrate this uncertainty or sometimes complete lack of knowledge of our Gulf States' species.

Stone and Cram, in "American Animals," say that the Florida wood rat is said to build its nest in dense, swampy thickets; that is to say, we have *no knowledge or photographs* of the nest of this rodent, notwithstanding the fact that scores of non-observing "tourists" have for years passed through the "swampy thickets" of this particular Gulf State. To the same extent, this is true of not a few of the fishes and birds of all that part of the country. Of such an abundant species as the "Worm Lizard" of Florida, Doctor Ditmars has not a word to say in regard to its *breeding habits;* and, indeed, we know practically nothing about it. Miss Mary C. Dickerson, in her splendid "Frog Book," is compelled to admit that "nothing is on record regarding the life history or habits" of the common Tree Toad of the Pine Woods of Florida and Texas—an admission that applies to other batrachians described in that work. Doctor Howard, in the "Insect Book" of this series, says of the common Ant-lions that "the so-called ant-lions are interesting creatures which have long attracted the attention of naturalists and of nature students. The average American country boy knows the ant-lion pits in the sand about as well as he knows the curious caddis worms in the brooks;" and yet, while various species of these are abundant in the region here being considered, Doctor Howard is obliged to admit, at the close of his interesting chapter about them, that "there is need of careful study of any one of our common ant-lions. The eggs should be described; the number of molts of the larva should be known, and the duration of the different stages under differing circumstances should be determined."

Think of it! The ant-lion is known to every American schoolboy—and that for many generations; and yet, up to 1901, our most widely known entomologist



A GLORIOUS GROUP OF YUCCAS IN THEIR NATIVE WILDS

Figure 14. This species of Yucca flourishes in certain parts of Texas and northern Mexico. Three of these are topped off with a grand pannicle of white flowers. It is frequently found growing to a height of 25 feet, and in groups. Its edible berries are relished by the Mexicans.



A FAVORITE ORCHID WIITH MANY COLLECTORS

Figure 16. We call it "Twayblade" for the reason that it has but two leaves; while botanists have named it *Liparia liliifolia*, contending that its leaves resemble those of some lilies—as the "lily of the valley." Orchids are found in many parts of Florida.



A TEXAS BIRTHWORT OR DUCK VINE

Figure 15. A loosely climbing vine, locally known as the "Duck Vine," as its unopened flower, seen on side view, resemble a swimming duck. Our Birthwort family (*Aristolochia*), is represented by a number of different species, growing in various localities througout the eastern States, the Pipe Vine, or Dutchman's Pipe, and the Virginia Snake Root being two of them.

is compelled to admit in print that we have no description of its eggs! This likewise applies to the habits and natural history generally of many of our Gulf States' moths and butterflies, as admitted by Doctor Holland in his two superb volumes on these important insects.

There is a fine "Mushroom Book,"—Nina L. Marshall being its author, and in the leading chapter we read that "although for centuries it has been known that some fungi contain the most virulent poisons, still, through ignorance of those points which distinguish the poisonous from the edible, frequent cases of poisoning occur in all classes of society." Speaking of many of the molluscs in her beautiful "Shell-Book," Miss Julia E. Rogers tells us that "little is yet known about the life history of many of these. The limits of distribution are vague and inaccurate for many. When does this snail lay its eggs? How long do the young require to reach maturity? When does that species seal up its doorway and go into the ground to spend the winter? . . . The careful observer, if he keeps a note-book, may discover and pass on to conchologists valuable facts in the life history of little-known species. The study of our land molluscs is very incomplete. It is a worthy and enjoyable opportunity that is open to the earnest young naturalists today."



A NATIVE PARROT OF THE UNITED STATES

Figure 17. At one time this little Carolina Paroquet ranged over the larger part of the eastern United States in immense number, but it is now nearly exterminated. Only a few of these birds are left in Southern Florida; it is a long-tailed green species, with red and yellow head. From life, by the author. As here shown, it is feeding on the seeds of the cockleburr, of which it is extremely fond.

What is admitted here holds true for a long list of the molluscs of any one of our Gulf States; and not only young naturalists but adult explorers should bear these facts well in mind.

Passing to botany, the same gifted authoress tells us, in her "Tree Book," that "trees are better known than less conspicuous plants. Fungi and bacteria are just coming into notice. Yet even among trees new species are constantly being described." This candid statement should be of especial interest to intelligent foresters, not only those at work in the Gulf States, but anywhere in the country. In as much as there are still undescribed species of trees in our forests, it is sufficient evidence of our ignorance in reference to them. Not a few plants

in the flora of the United States are still entirely unknown to botanists; and by all means the best way to study them, after their discovery, is pointed out by Neltje Blanchan in her "Nature's Garden," of the nature volumes here mentioned. From Jacksonville, Florida, to Brownsville, Texas, there are over 1,700 miles of coast-line, not including the shores of bays and minor inlets. Thousands of land forms occur all along the line, of which our knowledge is extremely meagre; while as to the marine forms that inhabit the waters of that long shore-line—of the Atlantic Ocean and the Gulf of Mexico—we have, upon the whole, but very slender descriptions indeed. Of many of the minute species we possess no knowledge whatever, and science is still ignorant of the existence of others.



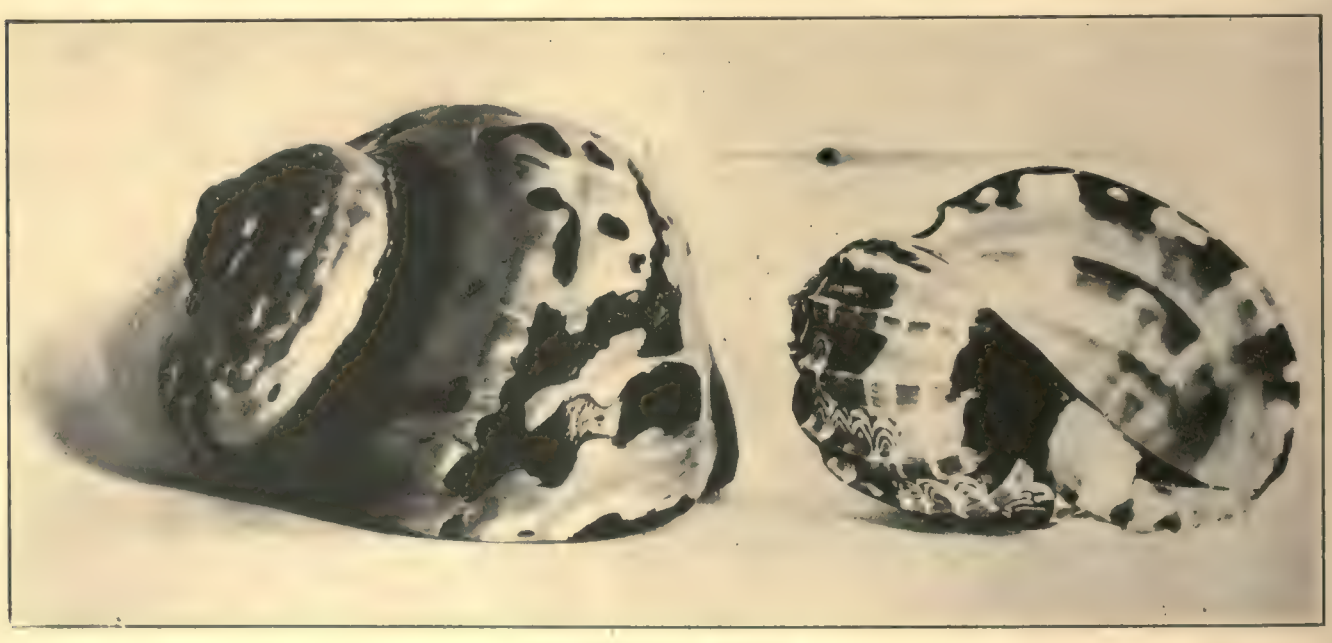
A FAMILIAR SHELL FROM THE FLORIDA REEFS

Figure 19. Hundreds of different species of shells may be collected on the Florida reefs, and the one here shown is among the most familiar. Its dark back, thickly sprinkled with round, white spots, is responsible for both its English and its scientific name—the Measled Cowry (*Cypraea exanthema*). (Seen from below.)

Do we hear an American forester ask, "Of what possible use or value can such knowledge as is here referred to be to me?" To which interogatory this prompt reply may be given: "Of all the use in the world. And the more you command of it, and the better you comprehend how to use it, the more efficient you will be as a forester in the forests of this country. United States needs every intelligent forester it can muster; or the time will come, however distant it may appear to many at present, when their services may be dispensed with altogether!

In many sections our small birds are now being exterminated with marked rapidity; and yet Philip Henry Gorse, in that delightful volume of his "The Romance of Natural History," says "doubtless many of our most richly wooded landscapes owe much of their timber to the agency of quadrupeds and birds. Linnets, goldfinches, thrushes, goldcrests, etc., feed on the seeds of elms, firs, and ashes, and carry them away to hedgerows, where, fostered and protected by bush and bramble, they spring up and become luxuriant trees." Nuthatches and squirrels plant acorns that often come to be the noble oaks of later generations. On the other hand, this author points out that "a number of tall, prostrate trees were lying about, upon which large columns of ants of all kinds moved busily to and fro. In penetrating into the depths of the primeval forests, one sees evidence at every step that these minute creatures are the destroyers of the colossal trees, whose strength braves all the attacks of storm and wind."

In several places in his work entitled "North American Forests and Forestry," Ernest Bruncken undertakes to demonstrate the connection between the forest and "the great forms of earth-life," and points out the value to the forester of a knowledge, as far as he is able to command it, of all things from insects to fire, from meteorological phenomena to earthquakes, that may directly or indirectly affect forests of all descriptions. This author, however, is not always happy in his synonymic comparisons, and thus exposes his lack of knowledge of certain



TWO BEAUTIFUL SHELLS

Figure 18. Our Florida shells compare very favorably with those from foreign countries in the matters of form and coloration. At the left a Top Shell (*Livonia pica*), which has been found in Charlotte Harbor, West Florida, and most abundantly to the southward. It is of value both as food and commercially. The smaller specimen is a Harp Shell from the Phillippines.

things we may find in nature. In denouncing the setting on fire of forests by "two dry branches being rubbed each against the other," he says: "No experienced woodsman or forester will believe such a tale. It belongs in the same category as the two-headed snake," etc. As nearly every extensive collection of reptiles in this country contains one or two specimens of "two-headed snakes," it would have been more to the point had a five-headed snake been selected as the monstrosity for comparison. Notwithstanding such slips, this work is a most excellent one, and has exerted a far-reaching and beneficial influence in inviting popular and governmental attention to the importance of forests and scientific forestry in this country.

As far as we can peer back into human history there has always been an intimate relation between man on the one hand and the forest on the other; and it always will be so just so long as extensive forests are to be found on this planet. But then, for man to successfully conserve forest growths and deal with forest protection, he must command, in the way of knowledge, all that he possibly can of what there is in nature that makes for such ends or militates against them.

TIMBER RAISING IN EASTERN UNITED STATES PAYS BECAUSE—

1. **There is plenty of cheap land unfit for agriculture.**
2. **The abundant rainfall permits rapid tree growth.**
3. **Transportation facilities by rail and water are good.**
4. **Numerous large cities furnish an adequate market.**
5. **The region is far removed from the virgin supplies of the Pacific Northwest.**

LONGLEAF PINE HAS HEAVY SEED CROP

ONCE in a great while occurs a heavy year for longleaf pine seed and forest officers returning from the Southern States say that this year, 1920, is an unusual seed year for this species. This report is confirmed by local lumbermen pretty widely throughout the range of the tree, which is, roughly, from North Carolina throughout the Atlantic and Gulf Coastal plain to eastern Texas. The occurrence is particularly noteworthy because the species matures full seed crops no oftener than about 6 to 8 years. Partial crops, or small amounts of seed occur irregularly during the intervals.

The seed commonly ripens by early September and falls to the ground soon afterward. If the fall weather conditions are not unusually dry, the seed commonly germinates in one to four weeks after it reaches the ground. Longleaf pine produces a large seed full of rich food so that it is eagerly sought and attacked by insects, birds and native or "razor-back" hogs. If fall and early winter conditions are favorable, the seed sprouts early in the spring with the coming of warm weather. As a result of the present abundant seed crop, many thousands of acres of longleaf pine forest land will undoubtedly be carpeted with seedlings by next spring.

The reason foresters are calling attention to the heavy seed crop and promising an abundant crop of seedlings by the spring of 1921 is, that they may bring home to the owners of longleaf pine lands the peculiar need for protecting their lands from fire. They point out that it would cost from 5 to 10 dollars an acre to restock by artificial means what nature is about to do gratuitously this fall. Owners of longleaf pine lands wishing natural reproduction to take place in this way should not fail to take action towards keeping out fires, commencing with the fall of 1920 and continuing for at least the two following seasons, and longer, if possible. The tender seedling is easily killed by fire during the first year or two. Afterwards, the small tree, although injured by fire, many times succeeds in pulling through. The native "razor-back," if present in any numbers during the early spring months, destroys practically all young seedlings by eating the thick spongy succulent bark around the taproot and must be kept under close limit as to numbers, or excluded altogether. On lands burned over by fires in the cold season and not oftener than every two or three years, the majority of longleaf seedlings may be expected to survive. Annual burnings by hot fires finally gets practically all of the saplings in the course of a few years. The common belief that fires do practically no injury to longleaf pine, or are even necessary for natural production, is doubtless based upon the remarkable resistance that the tree possess after early life of resisting serious injury from fires. Tender young seedlings are readily killed, and consequently every necessity for protecting them in a critical year like the present is particularly urgent.

A FOREST TRAGEDY

By John D. Guthrie.

He left his camp fire burning to see if the Lookout would pick it up.
He did.
He thought this would be a good test to see if the District Ranger was on the job.
He was.
He wondered if a fire would burn very fast in the dry forest.
It did.
He thought he could get away before the Ranger could catch up with him.
He couldn't.
He thought he could bluff the Judge at his trial.
He didn't.
He wondered if the Judge would have the nerve to sentence him to jail.
He did.
We wonder if he will put out his camp fire the next time he is in the forest.
HE WILL!

ANOTHER WORD ON "LIGHT BURNING"

BY FILIBERT ROTH, DEAN OF FORESTRY, UNIVERSITY OF MICHIGAN

STEWART EDWARD WHITE in the *Sunset* Magazine of March explains "light burning," and recommends it as a regular practice.

An artist in popular writing, White did this so well that California is quite stirred up, and lined up in two camps, and the matter is truly serious.

White is not only clever, but from his point of view he is also right, and the truth of what he claims seems so evident that there is no use in disputing. He makes two points:

Fires destroy "bugs."

Regular burning prevents accumulation of debris, and consequently prevents large fires.

The first claim needs no consideration; it is new, unproven and contradicts the experience of 100 years. The "bugs" (here the bark beetles), are encouraged and not discouraged by injuring pine trees. But this is very secondary.

The second and important point is well taken. Light burning with raking about the trees is an old practice in the South, and has successfully protected thousands of turpentine orchards. Simply burning the woods at frequent intervals has kept millions of acres of Southern pinery "clean" of brush, young trees and debris and thus has added to their safety from fire. "Use fire to fight fire," was advocated by the Michigan Forestry Commission years ago.

White's chief argument may be stated thus: Nature has maintained forests for untold centuries, she has had fires and bugs and storms and ice and all the other troubles and yet she has given us the most beautiful and useful stands of timber, a joy to see, and valuable beyond compare. This argument not merely seems true, but is true. If man would leave nature alone, as he did in the past if he would not log and lumber, if he would not clear land, travel, etc., nature would certainly go on indefinitely and maintain beautiful forests. But this if is not fulfilled and cannot be in the future; we do and we must log, build roads and railways, we clear the lands, we travel and we people the forests.

This White knows and it is to protect the forest against all these new enemies, as well as the old, that he recommends light burning as nature's great remedy to perpetuate the forest, whether this method will protect, at what cost in money and in injury to young and old trees, whether it can be made as effective as the protection now begun (for it is not one-fifth organized as yet), all this can be tested by experiment.

To most foresters the experience of the past is quite sufficient to fill them with apprehension, but being open-minded, there is no opposition on their part to meet experiment, but rather against a campaign which rests on inference and is not supported by experiment.

Since White bases his argument on the success of nature it is interesting here to consider how far she has really been successful and how far nature failed to work even without all the man-made difficulties of lumbering, clearing, etc., and also how far she relied on the light burning where she did succeed in building up stands of well-cleaned, now useful timber. If we leave out the hardwood district where fires rarely occurred and consider only the large pinery regions of the United States, this seems true:

Here in Michigan, white pine and Norway pine made stands of 75,000 feet board measure per acre and over; but 50,000 feet per acre for an entire forty was rare; 25,000 feet (a million forty), was "fine" timber; the old stock figure for pine was 5,000 feet per acre for large areas. Even doubling this old stock figure of 5,000 feet, and allowing 10,000 feet per acre as average, nature seems to have been about 20 per cent efficient. From large caliper surveys in the southern longleaf and shortleaf timber it is apparent that, for the long rotation with which nature worked she was not over 40 per cent efficient, even in real forest, to say nothing of the large areas in which she had nothing to caliper or to cut. In the Rocky Mountain Forests, or pinery, nature did maintain forest, it is true, but her success was even less than in the Lake Region and South. She burned altogether too freely; large areas turned to prairie; parks, south slopes and foothills, often the very best of sites were without timber, and taking the entire area of lands fit to raise timber and from our utility standpoint, best suited to timber, nature was probably not over 20 per cent efficient. The fine stands of lodgepole, yellow and white pine which she did produce, certainly did not develop under repeated fires, but were clean timber because they started in dense stands which would certainly have been destroyed if ever set afire. That nature burned irregularly, that large areas have not seen fire in a century is amply proven by any survey in lodgepole, which shows that this pine usually starts in dense thickets, at times so dense as to stagnate for many years. The California mountains are not very different from the Rockies. With extraordinary land and climate for the production of timber, with species which commonly grow to the age of 300 years and more, and with numerous stands of over 100,000 feet per acre, what is the *average stand* over the California forest area? Why has nature failed to cover fine forest sites with timber? What is the area of all that foot hill country covered with brush and forage stuff? Why the large areas where brush has followed the timber and will prevent timber growth for years?

Nature has done well; in her household chaparral may be as good as sugar pine, but from the standpoint of today and of our industrial people, her success is about the same as nature's effort at fruit growing with her huckleberry crop every 10 years, her wild cranberry and straw-

(*Continued on page* 572)

THE DEPARTMENT OF FOREST RECREATION

BY ARTHUR H. CARHART

ANNOUNCING THE DEPARTMENT OF FOREST RECREATION

NEW ideas and new methods develop to meet new or changing conditions. The first public appearance of a new publication or the premier greeting of a new department of an established magazine heralds some new situation or a condition which did not exist before or one which has grown to such size as to merit greater recognition. In this issue of "American Forestry" the department devoted to the recreational use of forest areas salutes all readers and thus signalizes a greater use of our forests as play areas and a new service for the lovers of the out-of-doors.

RECREATION existed on forest lands before the Roman Empire flourished. It was a paramount use of England's forests before America was discovered. It is no new thing. But the universal use of forests for recreation by the people of the United States has so recently developed to national importance it may be truly said that the activity is a newcomer to the group of uses existing on American forest lands.

INFORMATION and general knowledge of the opportunity for play and outdoor life in the forest regions have not kept pace with the new popular recreational movement and the rush to the forest playgrounds of the republic where magnificent vacation lands are found.

THESE statements are not excuses for this department coming into being, but set forth the reasons for its establishment to meet a need. It will aim to accomplish certain definite things which when summarized mean the bringing of greater knowledge of the play use in our great National, State and County forest and park systems, to the readers of this magazine. And thus it will add to the great sum of National wealth of health in mind, soul and body, especially among those who are led to visit and use these areas. It will establish a greater appreciation of the exceptional æsthetic values found in these great forest properties, and it will help build up the patriotic spirit of the country through directing citizens of the land to the great silent woods, the snow crowned peaks or the deep canyons where they may come to "Know America," and knowing her in all her marvelous examples of scenic beauty will come to love the "—rocks and rills,—woods and templed hills" of their home land with a fervor which will brook no policy or movement which threatens the peace of the land or its institutions.

VACATION OPPORTUNITIES IN YOUR NATIONAL FORESTS

HAVE you waited until now to plan where you will go on your vacation? Are you still debating whether to go to the country or to some beach? If you are in this quandary let me offer a suggestion; spend your play time of this year in a National Forest.

You will naturally wonder on what grounds this suggestion is made. The answer is found in the great variety of vacation activities available on forest lands for these extend from Gulf to Border and from Atlantic to Pacific and the different types of recreation found in them are almost as varied and extensive as the forests themselves.



THE VACATIONIST AT TRAPPERS LAKE IN THE WHITE RIVER NATIONAL FOREST IN COLORADO CAN SPEND MANY DELIGHTFUL HOURS FISHING FOR TROUT

Suppose you are looking for a place to simply rest. Any forest will offer this opportunity in some form or other. It depends much on where your home is located which forest you choose to visit. If your home is east of the Mississippi basin you can easily reach the White Mountain National Forest where you can get accommodations in some resort or farm house near the forest. Here are clean air, peaceful hills, pure water and the rest you are seeking. Or, if you prefer to travel southward, the Shenandoah and Natural Bridge Forests are to be found in old Virginia, and the Pisgah National Forest is in North Carolina. If you wish to visit the White Mountains or the green clad hills of Virginia or North Carolina, write the District Forester, at Washington, D. C., asking for information on these forests.

If your home is in the mid-west, there are a score or more places where you may go and find the rest you desire. Information, telling of vacation areas in the mountains of Colorado, will be sent if you send a request to the District Forester at Denver. Or from the same source may be had data concerning the forests of Minnesota, South Dakota and Wyoming. There are places where one may rest undisturbed by any hurry and rush of modern life in each of these states and within the boundaries of National Forests.

Perhaps you wish a place where you may row, fish and swim. Do not hesitate. Take your pen today and inscribe a letter to the Forest Supervisor of the Minnesota National Forest at Cass Lake, Minnesota. The town of Cass Lake looks out over the placid surface of the beautiful body of water of that name and is within easy canoe distance of scores of smaller lakes and streams where may be found the finest sort of a place to camp or build a summer home. In the midst of Cass Lake rises beautiful Star Island. There is a peculiar

thing about this island in that it has a lake within it that comes within thirty or forty feet of the main lake at two points and still has no surface connection with the outer body of water. The little lake within the island is about half a mile long and nearly that wide and is very deep.

Fishing in Cass Lake is excellent. In the deep cool holes and under the shady side of the great reefs lie gamey pike. With the greatest sort of vim pickerel strike at your bait and it is a poor fishing day when one cannot bring home enough of the fish inhabitants of this lake to satisfy the hungriest family. Just off of Cass Lake and where one may reach it with a canoe by portage is Lost Lake and if you can find it you will there get some of the greatest bass fishing in this forest. If you would not suspect it was a fish story I would tell you of the fine string of eight bass I saw one day last summer, each of which weighed more than two pounds, representing the success of about one hour's fishing in Lost Lake. And there are other lakes and lakes and yet more lakes in this forest. Bathing beaches abound on Cass Lake. Two superb beaches are on Star Island. Norway Beach, on the south side of the lake, is a very good bathing place and all around Pike Bay, a great arm of Cass Lake, are beaches equal to any.



DO YOU LIKE BATHING? FINE LITTLE BEACHES SIMILAR TO THIS ABOUND IN THE NATIONAL FORESTS

Motor boats, canoes and row boats carry one to the inlet where the Mississippi flows into the lake, to the old Indian mission near this inlet, to the Indian camps that are along the banks of the lake during the berry season and to the outlet where the Mississippi empties from Cass Lake. There is no limit to the water trips that may be taken in the Minnesota National Forest and each leads by a beach that lures one to dip in the clear



THE QUIET BEAUTY OF ONE OF THE NUMEROUS LAKES IN THE NATIONAL FORESTS, THE BENEFITS OF WHICH ARE AVAILABLE FOR THE USE OF THE PEOPLE

waters of the lake or loiter over fishing grounds that hold fighting game fish of large size.

What a grandeur of mountain scenery you will find if you visit the forests of the Western States! Everywhere there are peaks and pinnacles, cliffs and chasms. I cannot begin to enumerate the great mountain climbs that are to be found here. The highest peaks in the United States are within the borders of these Western forests and each presents a picture and an appeal that is nowhere found quite like it is present in these great playgrounds of the West.

Did you ever climb Mount Hood? You have a treat coming if you plan your vacation so you can visit this great king-like peak of Oregon. There are camping spots galore in this region and good trails lead through the tall boles of the forest trees which look for all the world like the columns of some majestic cathedral of Nature.

In the same region are Mount Jefferson and the Three Sisters, all of which are mountains of exceptional beauty. Good trout streams abound, waterfalls glisten in the settings of greenery and the lure of Oregon and her forests soon gets hold of your fancy. If you want to become one of the enthusiasts who yearly spend their vacations in the National Forests of the Pacific Northwest write the District Forester at Portland and tell him you plan on coming to his forest country this season and ask him where to go, how to get there, what to see and all about it, and he will give you that information. You will not be crowded for space there nor will you have a dearth of places from which to pick your vacation camp. Oregon has seventeen National Forests and Washington has been blessed with ten.

The home of the heron, the land of the big bull moose and the greatest canoe country in the world are found in the Superior National Forest of Minnesota. There is no place that will appeal more to the lover of canoeing than the unequaled canoe land in that great National Forest playground. The forest contains more than a million acres of land and within this are 150,000 acres of lake surface and hundreds of miles of streams.



A FINE CATCH HAS ALREADY REWARDED THIS DILIGENT FISHERMAN, WHO IS FISHING OFF SHORE IN ONE OF THE LAKES OF THE WHITE RIVER NATIONAL FOREST

There are more trips wrapped up in the Superior National Forest than any other great National Playground which can be easily reached by the people of the Middle West. There are canoe trips that take one only a few hours on a lake and there are others which test the grit of a sportsman and will engage his time for weeks or even months. If you wish to spend your vacation in the land of the old voyageur where today the canoe is the only sort of transportation that will reach many parts of this untrammeled country go to the Superior. There are the gamiest of northern lake fish, big game and stately forests. But remember in picking on this forest as a place to spend a vacation that it is a country best suited to real outdoor lovers and that there is a good lot of hard hiking to do over portages and some steady pulling on canoe paddle if you get anywhere. Write the Forest Supervisor at Ely, Minnesota, for information about this greatest playground for the middle west and the paramount canoe country of the world.

Shasta is but one of the myriad of mountains of exceptional beauty within California's forests. Twenty forests are in California and the great wealth of beauty for which the state is noted has the greatest share of it protected in National Forests.

Lake Tahoe, famed for its beauty throughout the world, is in the Tahoe Forest. On every hand where you may turn in California you will meet a National Forest. Fine auto roads pass through and to these great areas, and camp sites which are free are found at numerous points. Write the District Forester at San Francisco if you want to hear of the forests of California and their great recreational advantages.



A WONDERFUL SPOT FOR A SWIM—WAHTUM LAKE, IN THE OREGON NATIONAL FOREST

Between the eastern border of Montana and the Sierra Mountains and extending down to include portions of the states to the south are two great districts of the Forest Service. Millions of acres of forest land are in each. Probably nowhere in the United States can there be found any lands which have less evidence of man's dominion than are in the great forests of these districts. If you seek a land where you can utterly lose yourself for the whole season and where with pack train and guide you can loaf along through innumerable forests and meadows, write the District Forester at either Ogden, Utah, or Missoula, Montana, and these men will tell you of scores of places that will satisfy your longing for the great unspoiled wilderness, for in both districts there are many such regions.

Colorado's pinnacles, Wyoming's greatest fishing streams and hunting grounds and New Mexico's mountains and canyons nearly all are within National Forests. The great range of the Bighorns in Wyoming, the Medicine Bow range in the same state and the famous Wind River country are all in forests. Trapper's Lake, Ouray in its wonderful setting of jagged mountain sides and the famous Pikes Peak are all in Colorado's forests. The Sangre de Cristos, the longest single line of peaks in one range in the world, and the mystic Spanish Peaks are in the San Isabel National Forest, the most versatile National Forest easily reached from the East. Fishing streams and lakes by the hundreds, auto roads and free camps are found in Colorado's National Forests. New Mexico, glowing in the romantic splendor cast by stories of early Spanish conquests, has most of her historical and scenic areas within the National Forests.

And so the tale would run if all were to be told. In twenty-four states, East, West, North and South are 153 National Forests of the country containing the great total of over 155,000,000 acres of unbeatable vacation grounds.

The best news of all comes at the last. Each person in the entire Nation owns equal share in these great forest areas. They are yours to use to the fullest and in any way consistent with the greatest good for all. There are no fees charged for entering a National Forest. There is no charge for taking your auto over any of the roads built by state Nation or county. Camping is free. The trails are open to all. Hunting, fishing and all sports may be followed with only the laws of the state governing. Firewood is free. The entire system of forests is yours and mine to use. There are one or



AFTER STRENUOUS HOURS IN THE OUT-OF-DOORS, SUPPER IS OVER AND THE DISHES WASHED—NOW TO ENJOY THE CAMP FIRE

two simple rules to follow when you are in the forests. Be very careful with fire. It may mean hundreds of dollars spent in fire fighting and thousands of dollars loss if you are careless. Be clean in camp and practice good sanitation. It may mean great sickness or loss of life if you are not a clean camper. Are not those simple enough for a child to understand?

Should there be a quandary in the mind of anyone who knows of our great forests as to where to go to spend a vacation? It is hardly conceivable, for there is such a variety in the offerings of the forests, such a breadth of country represented in these areas, such an extent of acreage in each forest and a more astounding total of all that it will be a very exacting person who does not find in the National Forest territory a place especially suited to his needs and desires.

Finally, do not forget that these forests are yours. You are invited to use them and one way most of us can get direct value out of any one forest is to there spend the vacation time of this and coming years.

AUTO CAMP CONVENIENCES

ALL America has turned gypsy. Or at least so it seems when one takes count of the cars met on the highway. They come from every state and foreign lands. A recent report issued by the United States Forest Service, telling of the visitors to National Forest Playgrounds of Colorado, states that within the body of the great mass of visitors 1,082,000 in all for the one state, every state in the Union was represented as well as twenty-two foreign countries.

But gypsies must have camps, and the question follows, where? And that question has remained unanswered many places. But at some points communities have interested themselves in making the stay of the "pneumatic nomad" a pleasant one when visiting their neighborhood.



THE AMERICAN GYPSY PREFERS THE MODERN MOTOR CAR TO THE OLD TIME "VAN" AND MANY ARE THE CONVENIENCES OFFERED HIM WHEN HE TAKES THE ROAD TO SEEK NATURE IN HER OWN LAIR

Other cities, towns and villages are noting the friendliness displayed by autoists towards towns that have installed Municipal Camp Grounds, and have started like improvements. The result is a demand throughout the country for information on outdoor stoves, tables, etc., for picnic grounds and other camp structures which will adequately serve the purpose.

To give examples of all such structures that may come to the notice of one interested in camp development would take many pages. And such a collection would include many things that are hideous in design, as well as not serving a purpose for which they are designed.

But it is possible here to give some examples of the best things that have been done so far and in this manner point the way to better achievement in the future.

An illustration represents a small camp structure with a cooking and heating fireplace placed in front. This shelter is a modification of the lean-to open face cabin commonly called the Adirondack Camp. In this structure the plan has been further modified so there is an arrangement for a fire directly in front of the open side of the shelter to offer a place for heating and cooking.

The picture shown here was taken on the Pueblo Municipal Camp Ground, located in Squirrel Creek Canyon on the San Isabel National Forest. This area of 117 acres has been developed during the early summer of 1919 so it can comfortably accommodate about 100 people at one time. The place proved so popular parties from the city thirty-five miles away would motor to these improvements on Saturday afternoon in order that they might have some camp development in the way of fireplace or shelter for their friends and family on the picnic the following day.

Another bit of camp construction is shown here in the footbridge. On these grounds there are a number of fireplaces and two shelters. A trail and road ruins the entire length of the area connecting up all parts. A small stream has to be crossed at a number of points. Foot bridges are necessary to avoid wet feet. This one shown in the cut is typical of all on the area. The design is simple and in keeping with the setting.

Shelter-cabin, fireplace and footbridge are here combined to make a small plot of canyon floor, on the side of the creek opposite to the road, an attractive point at which to picnic. One noteworthy thing concerning this particular shelter is especially interesting. As near as this shelter is to the thick stand of young timber shown on the slope there never has been even a threatening of forest fire here. A properly constructed and rightly



A FINE CAMPING PLACE FOR ROAD LOVERS WITH MOTOR CARS, NEAR THE BOUNDARY LINE OF THE PIKE NATIONAL FOREST, COLORADO

placed fireplace used by careful visitors has prevented such a disaster.

A small cooking fireplace on this same camp ground is also shown. These fireplaces are placed near good water, fuel and pleasing view with all plans so arranged that there will be ample room at each fireplace for each party. The cost of these fireplaces is so low and the return is so great on investment that many more are planned for this same camp. The only materials that are needed for this fireplace, which must be purchased, are the half inch steel rods which form the grate and the necessary cement to bind the stones together. The fireplace shown is one of eight built by one man in one day, each of which have been in use throughout the season and will stand for a like use for several seasons to come.

Any autoist can build one of these fireplaces in a short time, and where the same family comes to a delightful spot many times during the summer such a convenience will always be appreciated and used. In this one small canyon camp two individuals have used these fireplaces as models and have built similar little camp stoves in spots they liked well.

All things considered, this open grate cooking fireplace is the most used camp development that can be built. The cost is low and replacement of the entire structure would not be prohibitive. Wood is conserved by making this fireplace small in the fire floor and distance between the floor and bars. In wooded countries the fire hazard is greatly reduced by the use of this camp stove. After the very essential sanitary arrangements are made on a camp area this cooking fireplace is probably the most desirable, low-cost, improvement which can be built.

A modification of this fireplace is found in Yellowstone National Park. The walls are of cast concrete, and while this may be very suitable in some locations, it is not in keeping with the general surroundings found in Rural Park and Forest Camps. A feature of this fireplace is its arrangement in the form of the Geneva Cross. This allows for building a fire in the arm which will have the best draft to fan the fire. Where stone is not available the concrete fireplace is well suited for camp use but should have some coloring matter added to the mixture to relieve the



A VERY DOMESTIC SCENE BY THE SIDE OF THE ROAD—UNDER THEIR OWN VINE AND FIG TREE. A MODERN, "MOTORIZED" GYPSY CAMP

white glare of concrete until such a time as fires can smoke up the surface.

A fine type of out-door fireplace has been developed by the city of Minneapolis. The entire portion of this fireplace which is above ground is made of metal, the whole being set solidly in concrete. The cost of this fireplace is much higher than either of the others shown, but it will last longer than the rubble or concrete walled fireplace. A very good feature of this arrangement is the lifting grate allowing the use of the crane which is a part of the metal portion.



A FIREPLACE IN THE YELLOWSTONE NATIONAL PARK WITH WALLS OF CAST CONCRETE. FINE IN ITS PLACE, BUT NOT SUITABLE FOR EVERY LOCALITY

The big central camp stove built by the city of Pueblo for the Municipal Camp in one of the city parks is also shown. A shelter and fireplace are here combined. During the day the sun's rays, peculiarly searching in the midst of summer, are kept from striking the cook at the fire, and if a sudden rain storm rushes over the camp the meal is not thereby delayed For a large camp this shelter is a very good arrangement. This fireplace served many groups at one time during seasons past, the limit served at one time being about eight parties and when the camp was much used these groups cooked in relays.

Sanitary arrangements in city locations give little trouble but in rural locations the planning for those necessities which will reasonably serve many people is more of a problem. Contamination of water supply will have to be guarded against and the fly problem will intrude. The best solution for many locations will be found in the flyproof pit privy properly located. The cost is low and if the campsite is laid out by a landscape architect, qualified to handle such problems, the public health will be entirely protected.

A very difficult problem in many rural locations is the establishment of a good water supply. Pumps and shallow driven wells may serve the purpose where there is little chance of contamination from surface drainage. Probably in all locations a shallow driven well of this type is preferable to an open stream no matter how crystalline the water.



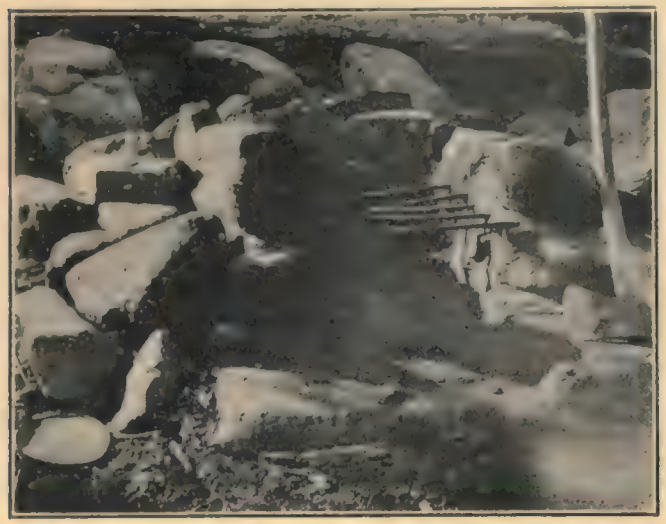
A SPLENDID ARRANGEMENT FOR OUTDOOR COOKING IN A DELIGHTFUL LOCATION ON THE SAN ISABEL AT THE PUEBLO MUNICIPAL CAMP GROUND

Stream water may do well in some locations in mountainous country, but there is always a chance of there being a source of contamination farther up stream. Water carried disease germs may be present in the clearest of water. This is true in the most remote portions of the forest and mountains though it is not usual to find any sickness caused by drinking water from a mountain brook far removed from civilization.

Springs often are reasons for locating picnic spots and camps. The location of a spring, in the past, has always been a point near which man took up his abode for it meant a continuous

supply of pure water. So springs today are often the best water supply of auto, picnic and vacation camps.

Several methods of making springs more usable, more attractive and more sanitary are commonly followed.



A SMALL BUT EFFICIENT COOKING FIRE-PLACE ON THE CAMP GROUND, VERY EASY AND INEXPENSIVE TO CONSTRUCT

The most common of these is to sink a barrel around the spring from which reservoir, fed from the bottom, the water is dipped. This method of utilizing springs is better than dipping water out of a muddy brook but the open cased spring is as liable to give the user disease as is the stream.

Another fault of the uncovered spring has been found where tourists frequent camp grounds. The spring is often used as a convenient wash tub. This sounds ridiculous, but it has actually been known to happen and that too at a point at which there was a running stream of clear water less than fifty feet from the spring. So it seems that the only way to protect the public is to make the spring as foolproof as possible, which is best accomplished by wholly housing the spring in a covered and buried concrete container, or catchment basin, and so arranging the overflow that it will fall through at least fifteen or sixteen inches from pipe, lipped rock or other spout where it may be collected for use by inserting a container under the fall.



CLEANLINESS BEING NEXT TO GODLINESS, THIS PUBLIC STATION ON THE CODY ROAD LEADING TO THE YELLOWSTONE COUNTRY IS EQUIPPED FOR THE CONVENIENCE AND COMFORT OF CAMP VISITORS, AND HAS AS WELL TWO FINE SHOWER BATHS

Probably one of the most highly developed camp conveniences that can be found in all the camps is found among the mountains of the west. It is the public comfort station within the Shoshone National Forest and on the Cody Road leading to the Yellowstone country. In this station, in addition to the usual arrangements found in such locations, are two shower bath equipments.

An ingenious plan arrangement has placed a stove in one end of this building and installed a large water front connected with a thirty-gallon range tank. A door from the outside opens into this portion of the small building, the entire water heating device being separate from the other two compartments. Fuel is plentiful here and a very little effort put forth by the camp visitor will give him the opportunity of getting a hot or cold shower bath. The degree of hotness attained is governed by how much wood the camper will feed to the stove and as the



BIG, CENTRAL CAMP STOVE BUILT BY THE CITY OF PUEBLO FOR ITS MUNICIPAL CAMP, BEING A SHELTER AND FIREPLACE COMBINED

entire water supply comes from a stream fed by melting snow the cold snappy finish to the shower is there.

Municipal, state, county and national provision for auto campers is a thing which has come to stay so long as the automobile is a commonly owned means of transportation. Wanderlust calls to each of us and the lure of the open highway beckons. More and more people will become gypsies of the auto highways, and there must be camps to accommodate visitors.

These camps are needed many places now and the coming few years will witness a greatly increased need.



THE METAL FIREPLACE SET IN CONCRETE, DEVELOPED BY THE CITY OF MINNEAPOLIS FOR OUTDOOR COOKING. WHILE RATHER EXPENSIVE IN ORIGINAL COST, IT WILL OUTLAST MANY OF CHEAPER AND LESS CAREFUL CONSTRUCTION

To keep these visitors from being unwelcome guests will be a problem. Camp areas properly equipped are the logical solution of these problems of taking care of our auto traveler-visitors. These need certain improvements and an attempt has been made to show what has been done so there may be better planning in the future.

PROTECT THE WOODS FROM FIRE

A tree will make a million matches—a match may destroy a million trees.

Take no chances with lighted matches, tobacco, brush, or camp fires.

Forest destruction is quick—forest growth slow.

Burned timber pays no wages.

When fire is discovered, put it out if you can. Get help if you need it.

Are you practicing fire prevention and forest protection?

HOME FOREST PAYS DIVIDENDS

A WELL cared for "home" forest wil make the farm more prosperous, add to the comfort of the farm home, and enhance the value of the farm as an investment, says a new publication, *Forestry and the Farm Income,* issued by the Forest Service, United States Department of Agriculture. Farm forestry properly practiced supplies timber for farm needs, enables the owner to market surplus timber profitably, furnishes employment for men and teams in winter, makes waste land yield a profit, and increases the sale value of the farm. Even if a farmer sells no timber, the woodland pays, says the bulletin. The time and money saved by having firewood, fence posts, and material for repair and construction conveniently at hand, and the protection afforded the crops, farm buildings, and stock are worth considerably more than the slight trouble and expense of raising and caring for the trees.

Farm woodland need not occupy land that will grow other crops, it is pointed out. On the contrary, the trees should be located on ground too poor to cultivate. A little care given in the winter or at other times when the farm work is slack will make such land produce valuable timber. If fully stocked with trees and well cared for, an acre of hardwoods should grow from one-half to one cord of wood yearly, while pine should produce from one to two cords.

The prime essential for success in farm forestry, the bulletin states, is adequate protection against fires. Forest fires kill the little trees outright and weaken full-grown ones, so that they may become diseased or infested with insects. It also destroys the humus cover and causes depletion of the soil. Burning over the ground for the purpose of improving grazing is characterized as an expensive mistake. Although it is possible to secure green grass for the stock a week or two earlier in the spring by such a practice, many of the rich leguminous plants and annual grasses are killed, leaving only the hardy bunch, wiry, and other coarse perennial grasses.

When timber is needed, the cutting should be done so as to cause the least possible waste of valuable wood and should not damage other living trees. The first trees to be cut should be the dead or dying and deformed and diseased specimens, which shade out healthy trees. Less valuable kinds, such as gray birch, aspen, blackjack oak, dogwood, sow wood, blue birch, ironwood, and others, should be removed in preference to the more valuable kind. By following this practice the woodland is constantly improved and its value is increased.

Preservative treatment will considerably increase the life of timber which is used for fence posts and other similar uses, and is distinctly worth while. Treatment with coal-tar creosote has been found to be far the most satisfactory process.

WHAT THE TREE TEACHES US

BY E. T. MEREDITH, SECRETARY OF AGRICULTURE

THE Department of Agriculture is intensely interested in the matter of tree culture from every standpoint—utility, beauty and better home life. I was surprised the other day to read that there are more acres of trees in the farm lots of America than of any other single crop; in other words, there are more acres of trees on the farms than there are acres of corn, or acres of oats, and so on. These farm woodlots yielded to the farmers something like $195,000,000 in a single year, but they might, with systematic management and care, produce several times that much, and we could have more trees that would continue to be a beauty and joy for years and years, for ourselves, our sons, and their sons. We should all appreciate the value of a tree and what it means to us.

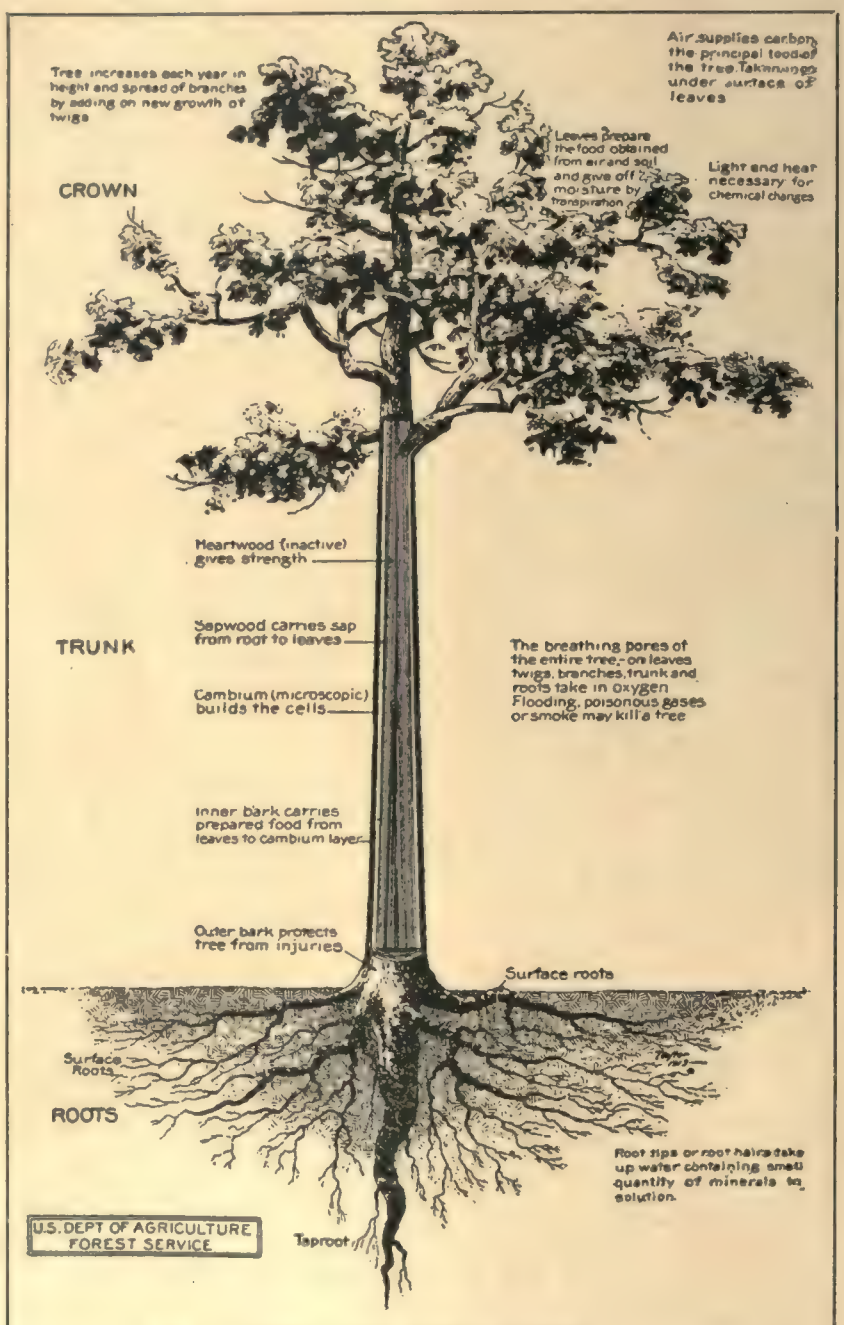
The other day I was asked to speak five minutes to some school children on this matter of planting trees, and I thought I would lecture them a little. I hesitated to point out to the older ones as I did to the children some of the things the tree stands for, and yet it does seem to me that, if we stop to consider some of the things the tree teaches us, it may help us to lead better lives and be better citizens. As I told the children the other day, the tree, for one thing, keeps its feet firmly on the ground. It is a good citizen. It is a substantial citizen. The stronger the wind, the more uncertain the foundation, the more firmly it attaches itself to the soil, the deeper it sends its roots until the solid foothold is secured.

A tree has its hardships just like an individual. Every time there is a strong wind and it is blown back and forth, the tree is strengthened. In fact, it needs that bending back and forth to develop its powers of resistance just as we in our lives are made better because of our difficulties and hardships. If we meet them and overcome them, we are stronger and better in our everyday lives and in our attitude toward others. We are of better fibre.

If you plant a tree too close to others where it is shady it is deprived of its light—and to us education is light. Such a tree is either stunted or grows up in a narrow sort of way. It does not have a wide outlook. It is narrow in its view. The same is true with you and me. Unless we get light, unless we study and are educated, unless we broaden out and see the problems of others, we are likely to be narrow in our views.

The tree which is planted in the light spreads out and serves with its shade and beauty. The same with you and me. If we broaden out, certainly we are able to serve and to "carry on" and do the things that constitute real service to our cities, our states, and our Nation.

Then, again, from this tree, with a small beginning, some great results may be expected. The same is true of



HOW THE TREE GROWS

The buds, root tips, and cambium layer are the growing parts of the tree. Water containing a small quantity of minerals in solution is absorbed by the roots carried up through the sapwood to the leaves and there combined with carbon from the air to make food. This food is carried by the inner bark to all growing parts of the tree, even down to the root-tips.

us, since from a small beginning, with proper study and light, we also grow and broaden. This very idea of tree planting originated with Secretary Morton, who thought out the plan simply as a means of beautifying the plains of Nebraska. The movement has grown until nearly every State and Territory in which you and I, as citizens, are interested has taken it up. It has also been adopted in the British possessions all over the world and in China and Japan, all which have their Arbor or tree-planting days. All that came from this suggestion of Secretary Morton, which was a small idea in the beginning. Now it has spread, and its leaves and branches have reached all over the world.

Then you and I also can take these suggestions from the tree that starts with such a small beginning. Those are some of the things I have told the school children. I hesitate to say them to you because as we grow older we feel that we do not need these suggestions; yet I do not believe they are lost upon you because I think even my telling them to the children did me good, and a reflection upon the tree as a model for us in our own lives will not be harmful to any of us.

If in this matter of spreading the idea of tree planting, there is any service the Department of Agriculture can render you, I know every person in the department will be glad to do so.

(*Extract from remarks by Secretary Meredith at the Tree Planting Exercises by the District of Columbia Federation of Women's Clubs.*)

ONLY DEAD TIMBER USED

BY MARIE DICKORE

BEREA College, at the foot of the Cumberland Mountains, has the unique distinction of owning two mountains, four thousand acres of forest, its own saw-



ONLY DEAD TIMBER IS USED IN THIS SAWMILL OF BEREA COLLEGE, WHICH IS RUN BY THE STUDENTS OF THE SCHOOL

mill but never cutting a sound tree. The photograph shows the sawmill with the two mountains in the background. In the foreground are logs with great hollows indicating that only fallen or dead timber is used in this sawmill. This wood is used for the college, for power, for heat and in the many cozy fireplaces in the dormitories and in the great open fireplace which delights every traveler who stops at Boone Tavern.

The sawmill, as well as the four thousand acres of forest reserve are under the direction of the Forestry Department and provide not only ample practical experience for the students of the department but also actual labor for those students who work for their education. The sawmill is operated by steam and, like every other industry at Berea College, is run by students who work at least two consecutive hours per day under the supervision of a superintendent of labor, who in turn, is responsible to the Dean of Labor. Students at Berea are given the opportunity to earn their expenses and they may select the work which is paid for at the regular rates according to the student's ability and efficiency. As every student in the college must work the minimum of two hours per day, suitable occupation must be provided by the Dean of Labor, and in the Forestry Department the students are very happy patrolling the forest, marking the dead timber, hauling the fallen timber to the sawmill, cutting it there for the required lengths, and then hauling the logs to wherever needed on the campus. No sound timber is cut as there is enough of the other to supply all needs.

WANTED—FACTS ABOUT SHADE TREES

SOME very interesting facts are coming to light through the investigation being made by T. E. Snyder, of the office of Forest Entomology, United States Department of Agriculture, of the number and value of shade trees throughout the country. Mr. Snyder is diligently collecting data on this subject, which will doubtless ultimately be compiled and issued as a bulletin by the Department.

The inventory and valuation of trees on streets and in the city parks of Newark, New Jersey, as of December 31, 1919, gives rather startling figures. The estimated totals read 134,232 trees, worth $4,038,971, to which Superintendent of Trees Bannwart says must be added one hundred thousand dollars worth of trees (about 2,000) in the six hundred acres of "County Parks" within city limits.

From the City Park Department of Washington, Mr. Lanham is sending interesting information. He says it is a most difficult thing to estimate the great value of the trees on the streets of Washington, some 105,000 in number, but that often five hundred to a thousand dollars more is charged for a real estate lot with a tree on it than for an adjacent lot without trees.

Park superintendents, city foresters and others in a position to co-operate with Mr. Snyder in the collection of this information should communicate with him directly here in Washington, at the address given above. All data and estimates of this kind will be very helpful to him and such co-operation will be much appreciated by the Department.

"THE TIME IS COMING WHEN TIMBER WILL

COMMENT by editors of the country on the article in American Forestry in regard to the possibilities of cattle raising and reforestation in the South was wide spread. The editorial co-operation with the American Forestry Association in its campaign for a national forest policy continues to grow and as a result the nation is being aroused to the great need for action. The report of the Committee on Forest Conservation of the American Paper and Pulp Association also called forth much editorial comment calling for action. Some of the expressions of opinion follow:

Tampa Tribune: In a recent issue of the AMERICAN FORESTRY Magazine, Thomas P. Ivy says that "in casting about for a solution to the problem of the future supply of cattle and timber, one naturally visits the South, where our great coastal plains are today being denuded of trees and turned into range lands for cattle."

He finds that vast areas of these lands are available for both timber and cattle growing, and the question immediately arises whether it will be better husbandry to reforest these cutover places and protect them from the burnings which cattle ranging indulges in, or to turn them into exclusive cattle countries.

He says: "That part of the Southern States known as the coastal plain has conditions which are most favorable for the development of the cattle industry in conjunction with reforestation, provided there is applied to the problem a well defined national policy that will enable the owners of these lands through governmental financial aid to develop their holdings in accordance with their best possibilities."

Just what are "their best possibilities" is matter for the forestry, agricultural and livestock departments of our various universities and state institutions to decide on and make known to the people.

The time is coming when timber will be just as much a necessity as beef is today. It is more valuable, in point of dollars, to the grower now than is beef. It would be a shortsighted policy which would pursue the old course of the farmer of a few years ago who grew the thing that came first to hand, whether it paid best or at all, because he had been growing that and his father and grandfather had been growing it.

The Times-Union observed some time ago, if we mistake not, that "our uncleared lands are not our best grazing lands." It is true. There are areas of timbered range in Florida where a cow would starve to death on less than ten acres. And yet there are those among us who persist in burning the grass with its possible young tree trying to fulfill nature's duty in reforestation, for the sake of getting this grass on ten acres to support a fifteen dollar bull.

Scientific and systematic cattle raising and reforestation are both much needed in the South, where we have reveled in the wanton prodigality of nature until her strength is nigh spent before we have observed that her ration to us is growing short.

ONE WEEK, EVERY WEEK!

Continuing the hearty co-operation with the American Forestry Association in its campaign for a national forest policy, the Newspaper Enterprise Association sent this editorial to hundreds of newspapers:

This is forest preservation week. Why?

Charles Lathrop Pack, president of the American Forestry Association, calls our forests the backbone of all industry and cites some figures to prove it. Take a look at these facts and then indorse the Association's move to have forest preservation week multiplied by 52:

Ten years ago the United States produced its entire supply of pulpwood, but now two-thirds of it is imported. This means freight rates to be added to the purchase price.

Indications are that supplies of pulpwood timber in New England and New York will be exhausted in 10 to 20 years.

Ten years ago the United States produced its entire newsprint supply—now we import two-thirds of it.

Do you wonder that newspapers are fighting for their lives? Do you wonder what makes the cost of building a home so high?

Experts predict saw-log lumber will be gone in 50 years.

The bulk of the original supplies of yellow pine in the south will be gone in 10 years, and, within seven years, 3,000 manufacturing plants there will go out of existence.

White pine in the Lake States is nearing exhaustion, and these States are paying $6,000,000 a year in freight bills to import timber.

New England, self-supporting in lumber 20 years ago, now has to import one-third of the amount used.

Fire destroys over $20,000,000 worth of timber every year and kills the reproduction upon thousands of acres of forest lands.

Within 50 years the present timber shortage will have become a blighting timber famine.

Forest devastation must be stopped; lands now in forest must be kept continuously productive; forest lands now devastated and idle must be put to work.

Speaking along this line the other day, the Montgomery Advertiser, which is in a state having great coastal plains being denuded of timber, and burned over for grazing every year, says: "Western farming interests are slowly encroaching on the preserves of the cattle breeders. The great grazing areas are being plowed under and sown to one crop or another. This is reducing the available cattle growing area of the country. At the same time we have steadily diminished the remaining supplies of virgin timber in the United States. The timber problem will one day be acute. Reforestation is essential."

Common sense, therefore, would indicate that at the earliest possible day this, and other States, should set aside certain areas for reforestation and keep from them any possible danger of damage by cattle or fire. Other areas should be set aside for cattle growing and should be protected from everything that makes for the injury of that industry. That would include cattle ticks, wild dogs and buzzards, which destroy new dropped calves, and scrub bulls. In other words, it points conclusively to the day of the open range and the free tick being at an end.

Christian Science Monitor: Just as everybody long ago came to understand that the prairies of the western central districts of the United States were synonymous with great herds of cattle, so now practically every one has come to realize that the steady encroachments upon these western cattle ranges for farming purposes has decreased the size of the herds. Almost everybody has apparently accepted it as inevitable that the number of cattle being raised should decline as the western lands were taken up by farmers. But one phase of the matter which apparently very few people in the country have yet appreciated is the neglected opportunity for at least partial counterbalancing of the herds displaced in the west by the raising of new herds on lands that are at present neither used nor occupied back east. The most valuable of these neglected lands are in the south. They represent great areas which have been cut over by the lumber interests, and are now lying idle, virtually as waste land. Lumber companies still hold great tracts of this kind, without doing anything to make them productive. And it is due largely to Charles Lathrop Pack, president of the American Forestry Association, that general attention is now being directed to the possibility of making these lands in the south contribute in a large way to the raising of cattle.

These lands are capable of feeding thousands of them at the same time that they are made to grow new timber. Use them in this way, he declares, and you can, in addition, provide new forests to supply the wood needed by the country when the forests that are now standing shall have been swept away by the ruthless methods now characteristic of lumber production. All these purposes are desirable in the highest degree. The shortage of wood pulp and the high cost of building materials, now only too obvious as items in the daily news reports, are convincing evidence that the nation's forests, as well as its grazing lands, have been reduced below the margin of national safety. And if the southern states can readily be made to supply the lack, there is only one more opportunity for the south to hasten an industrial reclamation which has been going forward

BE JUST AS MUCH A NECESSITY AS BEEF"

swiftly in that part of the country within the last two decades.

To anyone judging conditions in the United States purely on the basis of the relative density of population, it may be surprising to find that there are great areas of land practically unoccupied and out of use in sections where the population figures run high. We speak of "the populous east," having the Atlantic seaboard principally in mind, and often not even the people most familiar with actual population conditions there stop to realize what an acreage of practically unproductive land is still existent there, or what isolation is still easily to be found in the blank spots between the population centers. Massachusetts, for example, as the State having the greatest density of population of all the states, has still whole townships of vacant and virtually unproductive land. So what Mr. Pack now points out is worth noting, that the cutover lands, which mark the site of what was once an enormous forest of pine timber covering the coastal plain of the southern states, constitute 30 per cent of the total area of these states, or an acreage greater than the combined area of Alabama, Florida and Georgia; for it may be, as the forestry people are saying, that in this unproductive acreage is locked up the most important economic problem that now confronts the people of the United States.

Certainly there is general interest in the estimates of those who are calling attention to this matter. They say that these cutover lands of the south, on the lowest basis, would provide annual pasturage for over 10,000,000 head of cattle. That would be on a basis of about ten acres per head. And all the cattle now in existence in the United States number only about 68,132,000. If the southern states can carry one-sixth as many cattle as there are now in the entire country, apparently somebody should be getting busy about it, not only for the sake of the country, but for the sake of the south. And if three-fifths of these cutover lands that are now idle can be made to grow timber at the rate of 10,000 board feet per acre at the end of a timber rotation of fifty years, provided lumber and not pulp wood is desired, it is time something were done to start this new growth on its way. What can be gained meanwhile from turpentine operations, it appears, would give some additional momentum to the main purpose.

Of course the general direction and promotion of this sort of thing should enlist the attention and best activities of popular government. Federal and State authorities have the best kind of opportunity for co-operative action, first in a comprehensive survey of the field, then in promoting the occupation and use of the land by those qualified to handle it intelligently, and then in such protective legislation and law enforcement as would foster development in accordance with the general economic purpose. Something has been accomplished by private initiative in this territory within the last few years. Thirty per cent more cattle and 75 per cent more hogs are being raised there now than were raised there ten years ago. But these efforts are small in view of the vast potentialities of the opportunity. Government co-operation seems necessary if the waste lands of the south are to be given their full economic effect.

Richmond Journal: As news of it spreads about, the country's interest in the "Hall of Fame for Trees," now being compiled by the American Forestry Association, steadily grows. The Hall has, by this time, many candidates, among the more recently nominated being the "Great Tree on Boston Common," around which the colonists assembled for battle with the British, and which was blown down in a storm in 1918. "The Green Tree Hotel" at Le Claire, Iowa, is also of receptive fame. This is an historic elm, well known on the Mississippi River, because it was a waiting place for river men out of jobs and looking for trips. Its age is believed to be 120 years. Many Virginians to whom the old tree is a familiar sight, will be interested to learn that the Octopus tree, in Charles City County, has been mentioned for a place as the oldest and largest tree in the Old Dominion, and other candidates for this novel hall of fame include the De Soto oak, at Tampa, Florida, from which De Soto started for the Mississippi; the two oaks at Marlintown, West Virginia, marked in 1751 by General Andrew Lewis, and the tallest tree in the Balkans, at Podgoritza, nominated by the Red Cross, which had headquarters near it through the war, and from the naming of which it may be seen that the American Forestry Association does not intend to limit the honored ones to native products. This is but just, though America has enough to fill a respectable list exclusively her own if we will but take the trouble to look them up. For example, the first citrus fruit tree ever planted in Southern California, which now stands in the courtyard of the Mission Inn at Riverside, protected by a tall iron railing from the predatory instincts of unconscionable tourists. Trouble necessitates interest, and that interest, it must be said, seems to be rapidly coming up to the mark, so that we may expect in time a Hall of Fame for Trees of actual historic value, even greater than its appeal to sentiment.

Jamestown, New York, Post: As the forests disappear before the increasing population and the demands of industry, the science of forestry is developing rapidly. The national and State governments are encouraging the study of trees as means of preserving and distinguishing them. Trees are the largest and finest product of vegetation; therefore, in addition to mere utilitarian purposes they are desirable for their beauty. The American Forestry Association is registering all memorial trees in a national honor roll. This encourages planting of memorial trees. Those who cannot visualize the future beauty of these roads may wait long years to be impressed with their magnificence. Then, perhaps, others will begin to follow their example. Every new highway of importance is an opportunity for expression of civic pride in this way. Patriotic organizations of Jamestown and Chautauqua County have not yet been impressed with the idea of memorial trees, yet there are opportunities on every hand to place memorials to the honored dead, so that every traveler cannot fail to see and know and remember why the trees are there.

Ogden Standard: The announcement of the American Forestry Association at Washington to the effect that officers of the American Legion and of the Service Star Legion in every State are planning to plant memorial trees, recalls the claim made by an Indian town that it has the most famous street.

There are five houses on Lincoln Street in Crawfordsville, Indiana, and from those five houses went nine boys to the war for humanty.

There is a big tree on that street. It is called the Dumont Kennedy elm and all those nine boys played under that tree. In commemoration of the service these boys rendered in volunteering for trouble at the Mexican border and later going to fight abroad this tree has been dedicated as a memorial. Senator James E. Watson made an address in connection with the celebration held in the street.

The American Forestry Association wants to know if there are other trees with a history for its Hall of Fame. After all is said a tree makes a beautiful memorial and the move to plant thousands of trees in memory of brave men and women is highly commendable.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

SANTA BARBARA, CAL.

By Friends of John Black Clarke: Lieut. John Black Clarke.

GUILFORD, CONN.

By Darrow Post. No. 48, American Legion: Burton Monroe Lee, Herbert Hamilton Hall, Charles W. Darrow, Frank H. Bishop.

CLAYTON, DEL.

By Mrs. Alice F. Sinex: David Clouds Harrison, Bailey Stuart Ashby.

CHICAGO, ILL.

By Irving Park Women's Club: Sergt. Alexander J. Dunn.

CHICAGO HEIGHTS, ILL.

By St. Ambrose Episcopal Church: Norman E. Gilbert.

FREEPORT, ILL.

By Daughters of the American Revolution: Capt. Arthur F. Mosley.

OAK PARK, ILL.

By George Rogers Clark Chapter, Daughters of the American Revolution: Lloyd Havns Ghislin.

ROCKFORD, ILL.

By Harlem Consolidated Schools: C. C. Burns, Earl Pallott, Irving Pearson, Harry Thomas, Walter Collins, Lester Miller, Clarence Cusson, Willard Clarke, George Collins, Julius Faust, Curtis Lovejoy, Seymour Maltpress, George Easton, Wesley Morgan, George Evans Burritt, Honore Cusson, Harry Lee, William Mullens, Ward Fabrick, Clyde McFarland, Gene Heldridge, Sergt. Alfred Pickard, Lieut. Paul Conklin, Carlyle Corson, Mr. Love, Arthur Shrom, William Budd, Walter Budd, Ralph Blackinton.

BLOOMFIELD, IND.

By Wednesday Afternoon Reading Club: Rev. Merritt Owen, Rev J. A. Spencer.

SULLIVAN, IND.

By Women's Club: Sullivan Boys who died in the Service.

MARION, LIMA COUNTY, IOWA

By the Cary Club: Sergt. Joseph H. Barnoske, Everett J. Leasure, Leo G. Marchant, Justin M. Lillie, George L. Foulk, Clifford Murphy, Howard B. Brenneman, Earl B. Dodds, Cecil Harlan Biggs.

LEXINGTON, KY.

By University of Kentucky: Dr. J. H. Kastle.

NORTH BERGEN, N. J.

By North Bergen Public Schools: Betsy Ross, George Washington, Henry Clay, William McKinley, Theodore Roosevelt, Old Faithful, Victory, Gen. John J. Pershing, Fifth Grade Beauty, Abraham Lincoln, Woodrow Wilson, William Penn, Christopher Columbus, Ulysses S. Grant, Robert Fulton, Alexander Hamilton, Liberty, Benjamin Franklin, Henry W. Longfellow.

CRAWFORD, NEBR.

By George H. Adams: V. H. DeBolt. By Mrs. T. F. Golden: Hugh Golden, Victor Golden. By Mrs. Ervin D. Heltzel, Dr. Ervin D. Heltzel. By Mrs. G. V. Higgins, William E. Higgins. By Nannah Kennedy: Virgil C. Kennedy, Earl D. Kennedy. By Mrs. Harold King: Harold King. By Commercial State Bank: Cecil Lyon. By Esther McDowell: Robert E. McDowell. By Mrs. James Nestor: Francis Nestor. By Mrs. Harry Strohmeyer: Harry Strohmeyer. By Mrs. Page Francis: Frank Francis. By Mrs. J. A. Habagger: Edmund Habagger. By Mr. and Mrs. C. L. Leithoff: Merlin Remington, Thomas Remington. By Mrs. Henry Rennau: Claude Rennau. By Mrs. Bessie Wallin, Sergt. Thomas H. Smith. By Mrs. H. Lindeman: A. A. Lindeman. By Mrs. Laura Howe: Arthur P. Howe. By Mrs. J. A. Wolverton: Sergt. Frank Wolverton. By J. H. Barnum: George Barnum. By Mrs. W. O. Barnes: Homer Barnes. By Mrs. J. E. Porter: W. J. B. Porter, Lieut. O. W. Percy. By Dr. D. F. Richards: Frederick W. Hymes. By Mrs. J. W. Burleigh: James E. Smith. By Tha. Slider: Lawrence Arthur Slider, Clarence Everett Slider. By F. A. Diehl: Frank Andrew Diehl. By Mrs. B. F. Johnson: Corp. Archie F. Johnson. By Eula Barton Ivins: Lynne S. Barton. By Ray Moss: Roy Moss. By Mrs. Martha Ela Cullers: Arch Cullers. By Ellen Juden Sleeper: Lieut. Louis K. Juden. By Albert Lindeman, George E. Lindeman, Henry Lindeman. By Gwenn Wiggins McDowell: Verne Wiggins, Ernest Wiggins. By J. H. Ballengee: Paul F. Ballengee. By Ralph McHoes: Wayne C. McHoes. By C. A. Minick: Charles A. Minick, Jr. By Altar Society: Chaplain J. P. McMahon.

GUIDE ROCK, NEBR.

By Commercial Club: Our Living Soldiers Who Have Returned From the Great War. By Woman's Club: Our Soldier Boys Who Paid the Supreme Sacrifice in the World War.

BINGHAMTON, N. Y.

By Civic Club: Kenneth Ashton Copeland: James K. Nichols.

BUFFALO, N. Y.

By Hutchinson-Central High School: Hutchinson-Central High School Boys Who Gave Their Lives to Their Country During the Late War.

MINEOLA, LONG ISLAND, N. Y.

By the Agricultural Society: Soldiers Who Died at Base Hospital Here, Theodore Roosevelt, Effingham Lawrence, John Harold, Thomas H. Bacon.

HERKIMER, N. Y.

By South Side School: Carey J. Walrath, Toney George, John Myers, Leroy Foltz, Carlton Walrath, Joseph Kessler, Leslie Hellonack.

PENN YAN, N. Y.

By Penn Yan Board of Education: Lester Chisholm, Valentine P. Allen, Roy Bassage, Gerald Fisher, Warner Psynesr, Alfred Williams, Harold Johnson, Frank Waddell, Charles Costello, Fred Moran, Gerald McAdams, Carl Bromley, Philip Rilling, Sidney Vermilyea, Wesley Benedict.

NEW YORK CITY

By David W. E. Allen Post, American Legion: David W. E. Allen, Attileo Minarvini, Lester Brown, Peter Lonergan, Walter H. Lawrence, John A. Bickhardt, Ralph R. Malcolm, Albert P. Kovar, George T. Davis, William Wolfberger, Michael J. Ressner, Victor Guarini, Thomas F. Donovan, Sidney Fortner, Arthur Boyce, Glen E. Walter, Arthur H. Andrews, James Harper. By Harlem Board of Commerce: For Those Who Served, St. James' M. E. Church, For Those Who Served, Mount Morris Baptist Church, For Those Who Served, Reformed Church of Harlem, For Those Who Served, Holy Trinity Episcopal Church, For Those Who Served, Congregation Mount Zion, For Their Supreme Sacrifice, Reformed Church of Harlem. By Francis Galwey: Corp. Thomas Galwey. By George C. Webster: Churchill Pryer Webster. By Parents Association: Alfred Buxbaum, John Vincent Daniels, Jobnathan Hansen, Lieut. James J. Hoffman, John Cook Henshaw, Edward J. McNulty, Edward J. Martin, James J. Roman, William Albert Spence, David A. Seery, Harry Stoff, Emanuel Vanderporten, Matthew John Weldon, James Scott, Tony Tanalo.

WANTAGH, LONG ISLAND, N. Y.

By Wantagh Memorial Congregation: Bergen Raynow Seaman.

CANTON, OHIO

By Mrs. Mary E. Bowman: Sergt. Stanley S. Bowman. By Lincoln Highway Memorial Association: Fallen Heroes of Stark County.

MARTINS FERRY, OHIO

By Service Star Legion: Miss Neville J. Eberly, Miss Loretta A. Reasbeck, William J. Boehm, Harry King Cochran, Ellsworth Conley, Charles Criswell, Job Reese Harris, Stephen Claire Haughton, John Perry Holly, Maurice M. Kinsey, Alfred Lawfield, Clarence William Marquardt, Alfred H. Miller, A. J. McKay, Joseph Pisano, Carl Rossler Pratt, Edward Tate, Bertrance Taylor.

MASSILLON, OHIO

By Lincoln Highway Memorial Association: Lieut. Murray K. Spidle. By Junior Order of American Mechanics: Walter Wolf. By Knights of Columbus: Lieut. Walter Clements. By Post Office: Melville Hose.

NORTH INDUSTRY, OHIO

By Lutheran Church: Sergt. Stanley S. Bowman.

XENIA, OHIO

By. Mrs. Charles Jabe: Rev. John Ely.

CORVALLIS, OREGON

By Oregon Agricultural College: E. B. Blackden, Owen W. Johnson, Richard W. Wilmot.

CLARENDON, PA.

By Miss Bessie M. Driscoll: Franklin L. Mattison, Marshall O. Larsen, Raymond Bines, Raymond W. Wesling, Hugh McGovern.

DUNMORE, PA.

By Dunmore High School: Anthony Angerson, Thomas Bonavoglia, Everett J. Bushweller, John M. Clark, Salvatore Colimino, Joseph Ambrose Collins, William Cupple, Peter Demko, Joseph Dombrowski, George E. Dornhein, Jerome F. Dougherty, John J. Ferguson, Anthony Edward Gettings, Leo Cray Healey, A. Pierson Hurd, John H. McHugh, Benjamin McLean, Michael Medico, Anthony Mooney, Patrick J. O'Hara, Leonard J. Preston, Andrew Oliver Reynolds, Benjamin Richards, Joseph P. Ryan, Duane S. Salsberry, William Santarsiero, Jerome Simonson, Charles Skipper, Samuel Smith, Andrew Summo, Howard Swingle, Lloyd Gail Wilcox, Webster Altemose, Raymond Kunz.

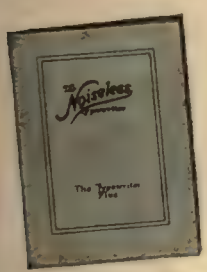


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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

LATE in 1919, Mr. Robson Black, of the Canadian Forestry Association, wrote Sir John Stirling Maxwell, suggesting an Imperial Forestry Conference. The British Forestry authority took up the matter and invited the British Dominions and Colonies to send delegates, and 35, from all parts of the world, met in London on the fifth of July. There were present 54 associate delegates. Canada was represented by Messrs. E. H. Finlayson, Forestry Branch, Ottawa; Clyde Leavitt, Commission of Conservation; Robson Black, Canadian Forestry Association; Mr. Kilbey, Canadian Government Railways; M. A. Grainger, Chief Forester British Columbia; Avila Bedard, Assistant Chief Forester, Quebec, and Ellwood Wilson. The meetings were held under the Chairmanship of The Lord Lovat, K. T., K. C. M. G., D. S. O., Chairman of the British Forestry Commission. The first day was spent in visiting the British Empire Timber Exhibition, and the second, in a visit to Kew Gardens, the celebrated Royal Botanic Gardens and Aboretum in London. The opening session of the actual work of the conference was held in the morning of the seventh of July, in the historic Guild Hall, and addresses were made by the Lord Mayor of London, Lord Milner, the Lord Lovat and several of the delegates. The Forestry Commissioners entertained the delegates at lunch and in the afternoon in the Council Chamber of the Guild Hall, the delegates presented their reports on the forest resources of the various Dominions and Colonies. These meetings were very impressive and especially the afternoon session when a mass of information on the forest conditions and resources of so large a part of the world was brought together. No such authoritative statements had ever been prepared and the conference had before it up-to-the-minute data for the study of forestry and timber supplies the world over. In the evening the delegates were entertained by the Forestry Students Society of Oxford, Cambridge and Edinburgh Universities. At this banquet, Sir William Schlich spoke most interestingly. The next day the delegates left for a trip through the Crown Forests of Dean, Highmeadow and Tintern, as the guests of the Forestry Commission and spent three delightful days in tramping through Dean Forest situated in the West of England and in getting acquainted with one another.

The Forest of Dean lies between the Rivers Severn and Wye in the west part of the County of Gloucester. This forest contains 18,700 acres under management and also a freehold of 15,594 acres, but, owing to the legal position, only 11,000 acres of the forest can be enclosed at any one time, so that the whole area cannot be placed under management. This area has been reserved as a forest since the earliest time the term "forest" originally meaning an area set apart for hunting and having little of its present meaning. This forest was originally oak and was used for supplying timber for wooden ships.

The greater part of the actual forestry work was first undertaken in 1808, and by about 1832, 11,000 acres had been planted up. In the early days the trees, on account of naval requirements, were grown with large spreading crowns in order to obtain knees for ships. After wooden ships were discontinued an effort was made to grow the trees taller and straighter. A great many plantations of exotic species have been made, including Douglas fir and Sitka spruce. These two species make remarkable growth and those of the delegates who were familiar with British Columbia said that the growth was certainly equal if not greater than that in their native habitat.

Oak is perhaps from one to one hundred years old, and the coniferous species from one to eighty years old.

The delegates were quartered in Speeche House, still belonging to the Crown, and in which in early times the old Verderer's court was held for trying cases of crimes against the Forest Law. These were very severe in the early days, and a man would lose his life or be mutilated for killing a deer and often a hand was cut off for killing rabbits or smaller animals.

The prices received for wood cut in these forests are rather interesting: Oak over ten inches, forty cents per cubic foot felled, lying in the road. Oak under six inches to ten inches about twenty-four cents per cubic foot felled. Beech, seventeen cents per cubic foot felled; Larch, thirty cents per cubic foot felled; Spruce, twenty-two cents per cubic foot felled; wood, for use in the mines, hardwood, $10.00 per ton; free on rail and coniferous species, $12.00 per ton, free on rail. Hardwood, cut into cord wood $5.00 per ton, free on rail.

The forest is in charge of a deputy surveyor, with a head forester and thirteen foresters with definite beats and charge of gangs working in these beats. The average number of workmen employed is 140 to 160.

The receipts in the Forest of Dean, for the period 1908 to 1918 amounted to $389,000, and the expenditure $440,000, making a deficit for ten years of about $50,000.

The Forest of High Meadow comprises about 3,580 acres, of which 3,349 are under timber. This was purchased by the Crown in 1817 and further purchases were made in 1824 and 1828. At the time of purchase the timber was between 50 and 60 years old, and about a thousand acres were planted with oak between 1825 and 1850.

Larch has been freely introduced in groups among the oaks to replace the matured standards cut out, but in most cases the groups were too small and the surrounding oaks were tending to close in over the larch. In 1911, a system of clear cutting and replanting at the rate of approximately a hundred acres per year was begun. A new working plan is now in course of preparation for these woods. The best of the soil will be given over to oak and the remainder will be planted with conifers and ash.

The prices ruling in the woods are practically the same as those in the Forest of Dean, but there is a larger quantity of good oak timber which sells up to 52 cents per cubic foot in the woods.

The excess of receipts over expenditures for the period of 1908-1918 amounts to about $1,000.

The Forest of Tintern, situated on the left bank of the River Wye, between the towns of Monmouth and Chepstow were purchased from the Duke of Beaufort in 1901 and contain 3,200 acres. The object of management since 1914 has been the production of coniferous and hardwood timber of good quality and also a supply of small wood for local turnery industry. A great bulk of the material which is cut in the wood is used for mining purposes. This applies to both hardwood and smaller coniferous poles. The better class larch poles are sold for telegraph purposes. The smaller hardwood material is utilized in the manufacture of chair legs, et cetera. Practically all the material is felled by the Crown and is disposed of to timber merchants. The prices run somewhat higher than in the other two woods.

The balance of receipts over expenditures for the ten-year period has been $36,000.

On July 10, the main body of the delegates returned to London while a special committee of thirteen remained at Tintern Abbey to discuss the policy and general conduct of the conference just in session This meeting was held in the Beaufort

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Arms Hotel at Tintern, overlooking the ruins of the famous Abbey of that name and the beautiful valley of the Wye River.

On Monday, July 12, the delegates met in the morning to elect a president and to decide on the procedure and form of an address to the King. After that there was a general discussion of the responsibility of the States for forest policy and it seemed to be the general opinion that as forestry was a long time business, that the State was certainly responsible for the management of forest lands owned by it and there was also the opinion that a certain amount of supervision over private forest holdings was the duty of the State.

In the afternoon a description and discussion of the Forestry Departments of all the various countries represented was held and much interesting information on these points was secured.

On the 13th, methods and problems of technical forestry ware discussed, including fire protection, reforestation, utilization and so forth.

In the afternoon the subjects of education and research were talked over, and it was the concensus of opinion that for England, at least, it would be better to have only one forest school, rather than the three which exist at present. It was also decided that a central Forestry Bureau for the exchange of information to be a sort of clearing-house for all sorts of forestry matters should be set up in London and also that some Central Bureau of Research which did not trench on any of the work being done by similar organizations should also be established.

On the 14th of July, the resources of the British Empire and the consumption of forest products were also discussed together with the scope for Imperial development. As different parts of the Empire have different kinds of timber and differ-

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ent needs, it was hoped that there could be an interchange of products between them so as to make the Empire self-supporting in its forestry needs.

From the 14 to the 20th of July, a tour of Scottish forests was made, and on returning the committee which had been appointed at the previous meeting presented their report, resolutions were discussed and adopted and on the 21st an address was presented to the King at Buckingham Palace from the conference.

In the afternoon, there was a discussion of the foundation of an Imperial Forestry Bureau and the session concluded by a banquet to the delegates given by His Majesty's Government.

On the 23rd a visit was made to Windsor Forest with a luncheon at the Royal Hotel Ascott.

In every way the conference was a great success and should be one of the brightest mile-stones in the history of forestry. The fact that the British Empire sees the need for proper forestry management of its timber resources and that men were gathered together from all parts of the world to discuss these questions in common is of the very greatest importance.

To sum up generally one's impression of this conference, the first thing was the splendid hospitality of the Forest Authority's members to the delegates. The meetings were conducted in the most business-like way that the writer has ever seen and moved more smoothly and a greater amount of work done per unit of time than it has ever been his experience to witness.

The delegates were promptly in their places at the opening of the sessions; speeches were short, business-like and without oratorical efforts and when anyone commenced to get off the subject which was being discussed by the conference he was promptly brought back to the matter in hand.

Lord Lovat, as chairman, handled these sessions in a most masterly manner, and to him is due a great part of the success of the conference.

The English Authorities did all in their power to encourage the delegates from overseas to express their opinion and to take the major part in the debate and in all the proceedings, and their fine hospitailty will never be forgotten by any of those present.

The problems confronting foresters in all parts of the world were found to be practically the same; lack of money, lack of continuity of policy, lack of trained personnel, lack of definite information in regard to forest resources, interference by political authorities, lack of definite forest policy and an insufficiently formed public opinion were found to be common to all the countries represented.

The setting up of a Forestry Commission in Great Britain has been a wonderful step in advance and this commission has been given a free hand and an appropriation of 15,000,000 pounds to be spent in reforestation of waste land and to encourage private planting for the next ten years. Great Britain learned a lesson during the war in its lack of timber supplies, and the necessity of importing everything from overseas. The present policy will be to establish sufficient forests to fill the needs of Great Britain for three years should any future war occur.

The situation in India was perhaps the best of any country because there Forest Authority has the full backing of the Indian Government and as this great dominion is not a democracy, the necessary power to establish a definite policy and to insure its continuity is present.

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SEALED bids in duplicate, marked outside "Bid Calimus-Marsh Unit," and addressed to the Superintendent, Klamath Indian School, Klamath Agency, Oregon, will be received until two o'clock P. M., Pacific time, Wednesday, October 27, 1920, for the purchase of the merchantable timber on the tract in Townships 31, 32, 33 and 34, Ranges 8, 9 and 10, Williamette meridian, Klamath Indian Reservation. The said unit includes about 67,000 acres with a total stand of approximately four hundred fifty million feet of timber, principally western yellow pine, of which about fourteen million feet is on about 2,500 acres of allotted land, as to which separate approved contracts with the Indian owners may prooably be made. Each bid shall state the price that will be paid per thousand for yellow pine, sugar pine and incense cedar, and for other kinds of timber that will be cut and scaled prior to April 1, 1924. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs for three-year periods. No bid will be accepted for less than $4.00 for yellow pine, sugar pine and incense cedar and $1.60 for other species during the period ending March 31, 1924. Each bid must be accompanied by a certified check on a solvent national bank drawn in favor of the Superintendent of the Klamath Indian School to the amount of $40,000.00. The deposit will be returned to unsuccessful bidders, but retained as liquidated damages if the successful bidder shall not execute contract and furnish satisfactory bond for $50,000.00 within sixty days from the acceptance of his bid. The right is reserved to waive technical defects and to reject any or all bids. For copies of contract and regulations, fuller description of the sale area, and other information, apply to the Superintendent of the Klamath Indian School, Klamath Agency, Oregon.

Washington, D. C, August 10, 1920. CATO SELLS, Commissioner.

With only one exception, all the foresters present, except those from Canada, were in favor of establishing and maintaining forests by plantation rather than by natural reproduction. The general reason for this was that under natural reproduction many undesirable and weed species take the place of valuable species or seed in along with them, making their management difficult and it was felt that planting was cheaper and a better means towards establishing forests.

This conference was so successful that it has been decided to hold one every three years and the next one will be held in Canada in 1923.

Messrs Clyde Leavitt, Avila Bedard and Robson Black made a trip through Holland and Belgium to the battlefields of France and some of the French forests after leaving the Forestry Conference in London.

The Society of Northeastern Foresters held their annual meeting in Canada this year, arriving in Montreal on the 27th of July and proceeded by train to Berthier where they were the guests of Mr. G. C. Piche, Chief Forester of Quebec, and after lunch visited the Government nurseries and plantations on the sand dunes along the C. P. R. Railroad. They were much impressed by the good results obtained on the drifting sand, especially in regard to the spruce trees.

On leaving Berthier, they went to Grand 'Mere and from there to Proulx, the headquarters of the reforestation work of the Laurentide Company.

Wednesday and Thursday were spent in inspecting the plantations, and Wednesday night a business meeting was held. On Thursday night there was a general meeting in which the eighteen members of the Northeastern Forestry Society were joined by fourteen Canadian foresters and a joint discussion of the demand for the removal of the embargo placed by the Quebec, Ontario and New Brunswick Governments on wood cut from Crown lands for export was thoroughly discussed.

On Friday morning, the party proceeded to Grand'Mere and inspected the plantation of the Laurentide Company and the mills and were the guests of the company at lunch. In the afternoon, fifteen of the members proceeded to Lake Edward as the guests of the Commission of Conservation and Doctor Howe, of the University of Toronto, where the experimental station of the commission, in co-operation with the Laurentide Company, was visited. Here they saw the sample plots and sample cuttings that have been made and were much interested in the results obtained.

Mr. Austin Cary, who represented the United States Forest Service at the meeting, afterwards proceeded to Quebec to discuss the work of the Provincial Government with the Chief Forester. He expects after that visit to go to Montreal to talk over the work of the Riordan Paper Company with Brigadier-General J. B White.

Captain H. A. Peck visited the Aviation Station of the Laurentide Company in order to inspect the work done in mapping the forests by aerial photography and also took a flight over the limits of the Laurentide Company to have our method explained to him. Captain Peck has been investigating the subject of airplanes or seaplanes for use in forestry and logging work for the Riordan Company and he was much impressed with the photographi work done by the Laurentide Company.

Mr. Roland D. Craig and Doctor Swaine of the Commission of Conservation and the Dominion Entomological Branch, were at the meeting of the Northeastern Foresters and afterwards took a trip in the Laurentide Company's seaplane, piloted by Lieutenant Stuart Graham, in order to see for themselves what kind of work could be done in reconnaissance on a large scale such as the Commission of Conservation is doing in a forest survey of Ontario. They were much pleased with the results of their flight and very enthusiastic about the possibilities of the machine.

FOREST GUARD KILLED WHILE FIGHTING FIRE

WHILE directing from the air the work of 100 or more fire fighters, battling blazes raging in the Lassen National Forests at Alturas, California, three men, two non-commissioned army officers and a government forester, fell over 1000 feet to their death on July 10, when their airplane went into a tail spin and plunged to the ground. News of the fate of the trio was received by officers of Mather field, a government flying field in California. The victims were:

Sergeant Wayman T. Haney.
Corporal —— Salcida.
Forest Guard Benjamin H. Robie.

Since July 4 flames have been sweeping the Lassen timber district. Aviators and foresters of the United States forest patrol service have been directing the work of volunteer fire fighters, circling over the blazing area in planes. When the fire appeared to be fairly under control, flames burst out anew in several places and late on the night of the 10th, the volunteers busily attempting to stem the fire's progress, were startled to see the plane suddenly go into a tail spin and shoot downward.

The machine landed at a spot where the flames were burning fiercely and if the occupants were not killed outright they undoubtedly were burned to death.

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BOOK REVIEWS

VACATION DAYS IN COLORADO'S NATIONAL FORESTS

BOOKLETS with good information concerning the out-of-doors are always sought by those who are looking for some attractive place to spend their vacation. The government puts out some of the most interesting of pamphlets describing the many vacation lands of the National Forests. It is planned to keep the readers informed of these as they come out and where they may secure copies for their use.

"Vacation Days in Colorado's National Forests" is one of the first of these booklets to be issued and if those which follow show improvement it will be only because this one first publication has given an incentive to publish something that is distinctly worth while.

The booklet is bound in an attractive cover inside of which there is a director of all the National Forests found in Colorado. Following that there is a general introduction to the idea of forest recreation and the National Forests. Then follow descriptions of all of the forests in Colorado which tell in each case of some of the more striking scenic features of that forest. Trips are outlined, camps are located for the tourist and the height of the greater peaks in each area is noted. Information as to how to reach each forest is given and that with the directory of forests in the front of the book insures a ready source of information to all those who possess the booklet.

In the back part of this booklet is found a short sketch telling how the forests are administered and of the great wealth found here. A short discussion of fire prevention and camp sanitation is found following this and the remainder of the booklet is given over to lists of equipment for camp trips, the rations needed for men in camp, the tree zones of the mountains, a photographic exposure table for Colorado and a map of the State showing the forests, cities and railroads.

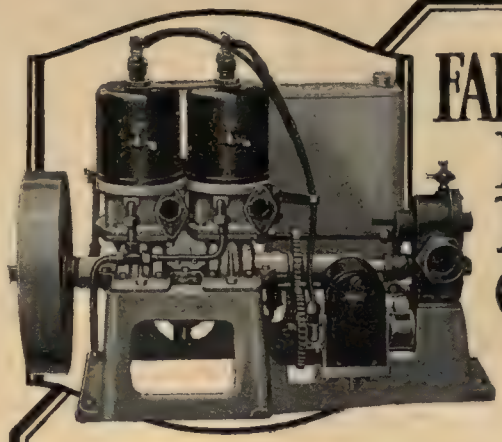
This will prove a very interesting booklet to anyone who is planning on visiting the west or who has spent time in the Rockies. There are many fine pictures printed in its pages and the reading matter is far from dull. A copy will be sent free of charge to anyone if they will write the District Forester, Denver, Colorado, and ask that they be sent "Vacation Days in Colorado's National Forests."

THE Report of the Forest Service, made in response to Senate Resolution 311, introduced by Senator Capper, on "Timber Depletion, Lumber Prices, Lumber Exports, and Concentration of Timber Ownership," together with a summary of this report, containing the recommendations in full, are now available. Application should be made to the Superintendent of Documents, Government Printing Office, Washington,

D. C., the full report costing 25 cents and the summary five cents (stamps not accepted).

With regard to these reports, the Forest Service is calling especial attention to the first of the recommendations for Federal legislation. This recommendation is for a substantial increase in the existing co-operation between the States and the Federal Government in the work of forest fire prevention. If we are to have timber in the future, we must stop burning our forests now. At present the Federal Government is co-operating with 25 States in fire protection work, but on a very inadequate scale. Therefore, the recommendation for increased co-operation was placed first as being most urgent. The public interest in these matters is intense and the demand for the publications insistent.

THE *Forest Club Annual* for 1920 is now available. It is the official publication of the Forest Club of the University of Washington and comprises a 100-page book covering the activities of the College of Forestry, containing scientific and popular articles about forestry and lumbering, as well as a complete roster of the students, ex-students and alumni. Owing to the present urgent need for putting our forests on a permanent production basis in order to insure a regular and permanent timber supply, this problem has been especially emphasized in this issue. The *Annual* is published and financed entirely by the students of the



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College of Forestry. It is full of interesting material and may be had by applying to the Forest Club, University of Washington, Seattle, Washington, at seventy-five cents per copy.

ANOTHER WORD ON LIGHT BURNING

(*Continued from Page* 548.)

berry. If we are to have timber, and surely we shall need it, nature's way is not sufficient ever if we could leave her alone in her work. We need to do with the forest as we do with the field of the farmer, we need to have every acre of forestland bearing a crop worthy of care and attention.

But the fact remains that while Congress is unwilling to spend more than about one-tenth the sum required to care for the peoples' forest properties; while the States and individuals do practically nothing, as is still the case, in spite of the "big talk," so long it must seem to many people, just as it does to Mr. White. What is the use of this partial protection which merely piles up the stuff for the next big fire? To this we can only say: Have a little patience; remember that the Forest Service is only 15 years old; that it has stopped hundreds of bad fires and that Congress and the people are learning.

That we need the change is evident when beech logs which 25 years ago had no sale value at all, can now be sold for $120 per thousand board feet here in Michigan; when ash brings $150 and oak flooring $300, and a single white pine tree sold for $250 on the stump.

We in Michigan and the East are coming to California for our lumber now and what will be the situation 50 years hence? It is encouraging to see men like Senator Capper of Kansas see the pressing needs of our country and start some movement of promise.

What will the campaign for "light burning" in California accomplish? Hard to say. The first thing it will do is to start incendiarism; the wholesale burning by every feeble-minded or evil-minded herder, rancher, etc.; it will educate the people to the same position so often met in South and North, where the jury refuses to allow guilt because of the doctrine; it will cost California millions; it will lessen the forest supplies of the Nation; it will prevent millions of young trees and thousands of fine young stands of pine from growing into anything fit to cut; it will delay the start for real forestry by half a century, and it may spread the evil doctrine to the rest of Western forests and revive it in the South and East. What to do? Stop campaigning until we really know. This can be settled by experiments and the Forest Service, as I understand, is now planning for just such experiments where the advocates of light burning can be on hand and help on the job. In the meantime, respect and enforce the law and lock up the firebug.

TOPIARY IS BEING REVIVED IN ENGLAND

TRAVELERS on the great highway which leads through Staines by the Belfont church can see two ancient yew trees cunningly trained and clipped to represent peacocks, which stand on either side of the wicket gate. . . .

They are large trees, ages old, and how many years of care and skill with the pruning knife they stand for none can tell. These are, perhaps, the most familar examples of the topiarists' art near the metropolis, but in formal gardens of many stately old country houses their like may be seen in abundance. They are accepted as curiosities, survivals of times past when men had more leisure on their hands than today.

The shaping of living trees into birds and beasts, into spirals, pillars, cannon balls, and any other fantasy chosen, still exists as a British industry. In the Royal Kew nurseries, close by Richmond town, is the largest collection of topiary in the world—nearly 3,000 trees, each one of them trimmed to some animal or bird or architectural form. The work has been done in this open air studio, and it has

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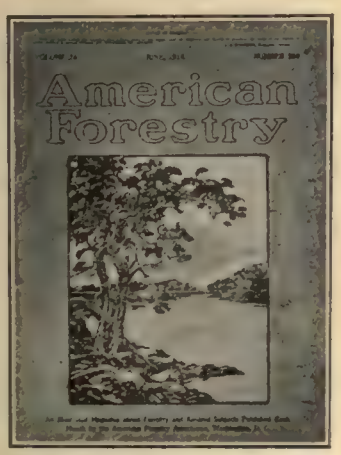
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required exemplary patience. The trouble about establishing a formal garden in years past has been that you do not live to see it. The next generation may enjoy it; but with forms that take 40 or 50, even in cases 80 years, to bring to maturity, it is only the grandchildren who can hope to witness their full perfection.

In the Royal Kew nurseries are specimens that have had 45 years' care and attention. Cock pheasants, sitting hens, peacocks with spread wings, dogs, geese and ducks, all growing, thickly cumber the ground. It must be a nightmare of a place to stumble upon unexpectedly on a moonlit night, with all these immobile forms about. Holland for centuries has assiduously cultivated this art, but in England it has experienced cycles of favor, followed by neglect.

Topiary has revived under conditions which make it no longer necessary to spend a lifetime in cultivating and pruning a tree into forms that others may enjoy. The science of horticulture has made great strides. By transplanting each three or four years the main root is kept in check and fibrous roots encouraged. The roots thus form in a close cluster, and the entire tree, having had from 15 to 40 years' shaping in the nursery, may be transplanted bodily to its permanent place in the newly laid-out garden. Possibly some of the extravagances of the topiarist's art are best avoided, but simple pillars, or cones, or spirals, or round clumps, spaced well apart, give dignity to a terrace or lawn which few other growths can equal.

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JOHN E. STERLOFF.

"I am very much interested in the magazine and heartily in accord with the conservation of our timberlands, which the American Forestry Association is so ably advocating."

G. H. WOODROFFE.

ACCEPT FOREIGN JOBS

THE United States Forest Products Laboratory at Madison announces that two of its experts in kiln drying have resigned to accept positions in foreign countries. Mr. C. V. Sweet and Mr. L. V. Teesdale, who have been with the laboratory for nearly two and a half years, will enter the Forest Service of the Indian Government. Mr. Sweet will have his headquarters at Dehra Dun, India, in the foothills of the Himalaya Mountains. Mr. Teesdale will be located at Rangoon, Burma, which is situated in the lowlands bordering the Sea of Bengal.

Both men will be engaged in the investigation of commercial methods of seasoning timber. Their work will differ only as geographical conditions affect the character and availability of the timber, and will involve travel and exploration into all accessible parts of the provinces as well as laboratory research at the institutions already established.

India and Burma are heavily forested with exceedingly valuable woods, which, like all the other natural resources, are the property of the Government. In the art of silviculture and its development the East leads the West, but in commercial processes of utilization of the wood products the East has much to learn from Western countries, especially America. The availability of the wood products for commercial use depends largely on proper methods of kiln drying, and it is as technical experts in this subject that Mr. Sweet and Mr. Teesdale enter the far Eastern service.

BAMBOO FOR PAPER PULP

THE scarcity of newsprint paper gives special interest to the statement that edible and timber bamboo are both adapted to the climate of the Gulf States and are in a position to aid materially in the production of paper, poles for many purposes for which growing timber is now cut and as an excellent and nutritious vegetable food. This statement is the gist of a report on eight years of experimental work, concluded by E. A. McIlhenny on his plantation at Avery Island, Louisiana, made July first to the United States Bureau of Plant Introduction.

The difficulties which exist in transforming tropical grasses, reeds and rushes into paper are said not to apply to bamboo; and bamboo, unlike the great forests of the temperate zone, grows rapidly so that the supply of paper material would renew itself from season to season. Burma is one of the tropical countries where bamboo is very abundant and it has also necessary facilities for transportation.

Not only is the bamboo of rapid growth and some species attain a great size, even 70 to 100 feet in height with trunks a foot in diameter, but it is often found in arid localities which would otherwise be destitute of vegetation.

FOREST SCHOOL NOTES

SCHOOL OF FORESTRY, COLORADO AGRICULTURAL COLLEGE

SINCE June 9 forestry students of Colorado Agricultural College have been occupying the Forestry Lodge 45 miles west of Fort Collins in the heart of the Rockies, writes Professor W. J. Morrill. There are six students in the summer course, which is optional, but of great importance in the preparation of foresters for western conditions.

"The Lodge is rather inaccessible, thirty miles from a post office and ten miles from the end of possible auto transportation. But it is well equipped with hot and cold water, two bath rooms, screened sleeping porches, a large stone fireplace, good kitchen and the inevitable game of horseshoes. Eight miles by trail and half that distance by air line is the top of Hagues Peak, 13,562 feet elevation, and Hallell's Glacier, in the Rocky Mountain National Park. The night air is direct from the glacier, which causes one to hunt for all the bedding available. The Lodge is at an elevation of 9,027 feet, in Pingree Park.

"The college owns 800 acres of Lodgepole and Engelmann spruce near the Lodge and about the same acreage some nine miles east of here. Timber cruising, mapping, surveying, forest entomology, field geology and silvicultural operations, together with trout fishing and hiking take up the time. And soon we shall move, by man packing, over the Continental Divide to study logging and milling in Middle Park."

MICHIGAN AGRICULTURAL COLLEGE, FORESTRY DEPARTMENT

THE Forestry Summer School was held this year on the lands of the East Jordan Lumber Company, near East Jordan, Michigan. There were twenty-six students enrolled and the courses given were forest mensuration and lumbering. The camp was located in a tract of virgin hardwood, hemlock and pine timber which offered excellent facilities for the work. Three ball games were played by the students during the course of the school, two with East Jordan and one with Charlevoix.

Eight men graduated from the Forestry Department of the Michigan Agricultural College in June and one more graduated at the end of the summer course in August.

All of the freshmen agricultural students of the college take a course in farm forestry which this year was given to one hundred and seventy-five students. These were in addition to the students specializing in forestry.

The Forestry Department of the College shipped 105,000 trees this spring. These were mostly two-year old seedlings and four-year old transplants. They were sold to farmers of the State at practically cost for forest planting.

NEW YORK STATE COLLEGE OF FORESTRY

THE summer of 1920 has seen all records broken in calls for practical trained foresters for field work in every part of the country, according to the figures given by the New York State College of Forestry at Syracuse. Part of the work of the college has come to be an employment department for its men, under which an effort will be made to properly place, according to their qualifications, foresters and undergraduate students in actual field work along professional lines.

The system was worked out definitely this spring, through a faculty committee, of which O. M. Porter, former Forest Service man, a returned captain of Forest Engineers, was the executive man, and this work will be continued permanently as a function of the extension department of the college. Laurance Lee has taken over the work of Mr. Porter, who has become assistant secretary of the American Paper and Pulp Association, under Dr. Hugh P Baker, former Dean of the New York State College of Forestry, and has begun a plan of checking up with employers on the work of the men who were sent out by the college.

There were calls for about 400 men for practical forestry or lumbering work received by the college this spring, of which about eighty were for permanent employment for graduates, and the other for summer work for students who have not completed their work. The calls came from about seventy-five sources, ranging from the Federal Forest Service to private lumbering companies, and places as counsellors in boys recreational camps. This great demand was a surprise even to Syracuse foresters who had seen the demand for foresters increase with the growth in America of the forestry idea.

Some of the work being done by these foresters is as follows: Two men are in parties cruising pulp wood lands in northern Ontario. A party headed by Prof. Reuben P. Pritchard, and including one graduate student, one alumnus, of an early class, two graduates of this year's class and two freshmen, is working for the James D. Lacey Company, near Cheat Bridge, West Virginia. Five men are in Wyoming driving tie timber on the rivers, under a new plan by which a lumber corporation is employing college men instead of the old "river hogs" to drive the rivers. One of this year's class has gone to management plan work for the Federal Service's new

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

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MAN WANTED with technical training and practical experience sufficient to make him thoroughly competent as a developer of Park plans, and also Park Superintendent—both in road construction, planting and landscape work—and Director of Forestry Service upon the public streets and parks of the city. Address Box 910, American Forestry Magazine, Washington, D. C. (6-9-20)

POSITION OPEN for Forest School Graduate. Work along practical and technical lines. Location, Southern Appalachians. Answer in own handwriting and state age, training and experience, and salary desired. Address Box 950, Care AMERICAN FORESTRY Magazine, Washington, D. C.

WANTED—An assistant forester. Good place offered for a recent graduate who would like to get in business for himself in an excellent location. Address Box 920, AMERICAN FORESTRY MAGAZINE. (8-10/20)

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WANTED—Position as Forester and Land Agent. Technically trained forester, 33 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

DISCHARGED SAILOR would like position as assistant forester or a permanent position as surveyor with some lumber company with a chance for advancement. Salary is of secondary consideration. Married, so would have to locate in some small town. Have had four years' practical experience in general forestry, and some tree surgery. Address Box 900, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C.

SUPERINTENDENT retail lumber and building material establishment desires connection with progressive lumber concern in locality where there is opportunity for growth. West, Southwest or Middle West preferred, but not essential. Several years experience retail and manufacturing, also eighteen months overseas with Forestry Engineers. Available after August 15th. Address Box 930, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C. (8-10-20)

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C.

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forest in Tennessee, another to the Forest Service at Lander, Wyoming, while another, is assistant manager of the Mammoth Hot Springs Camp on the Yellowstone National Park. Another alumnus of the college will be camp director this year for the Syracuse Boy Scout council, which maintains a permanent camp for two months on Crooked Lake, near Syracuse.

The wide scattering of foresters shows that the industries are realizing the need for forest trained men in manufacturing concerns and industries using wood. In addition to this list of men in field forestry, another long list could be given of men who have gone to saw mill and similar concerns for the summer work.

Prospects for next fall are that there will be a record-breaking class, indications being that there will be 150 accepted for entrance into the new class, as against 120 last fall, that being a record to that time.

The students at the State Ranger School at Wanakena, a department of the New York State College of Forestry at Syracuse, have planted 50,000 trees this spring on the school forest, making a total of 150,000 trees now planted and under observation. The school also made surveys and plans for the reforesting of a 1,700-acre tract for the National Paper Products Company at Streeter, New York, on which a start was made this year with 60,000 transplants.

A. E. Fivaz, a senior, will be president of the Forestry Club next fall, with G. E. French as secretary. Ralph E. Frobisher was made the school representative in the International Association of Forestry Clubs.

Six foresters were included on the Syracuse University lacrosse team which won the northern intercollegiate championship this spring, and of these three seniors were given the university Block "S" as a trophy, the same honor given to players on the football and oher major sports teams.

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C.

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C.

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PLANT MEMORIAL TREES

PHILIPPINE FOREST SCHOOL

THE graduation exercises of the Class of 1920, of the Philippine Forest School, at Los Banos, were held in the Malaruhat Plantation, hereafter to be known as the Commencement Grove.

The class marched to seats under the trees where the Juniors and visitors were assembled. Forester Zschokke gave a short talk on "Put Yourself in His Place," emphasizing the need of understanding the point of view of the men with whom the graduating class would soon have to deal.

The diplomas were then handed out, and the honor graduates were as follows: Highest scholarship, Tin Me Hai, Ling Gien Ying; winner of the Ahern Medal, Luis Adona; first honor man, Juan Fontanoza; second honor man, Amando Curaming.

Professor Harold C. Cuzner, Dean of the College of Agriculture, made a few remarks. He said he was delighted to be present and while he had no special message to give, still he felt that it would not come amiss to emphasize the need of understanding the other man, saying, "No one can do his best work if he creates friction and animosity and the only way to avoid unnecessary misunderstandings and opposition is to put yourself in the other man's place and when you understand him you can prevent friction."

Mr. Harry T. Edwards, former Director of Agriculture, gave them some good advice and ended by saying, "Concentration of your energies upon the essentials means success upon this new trail that you are today starting upon."

The Forest School orchestra furnished music during the exercises. After the exercises were over, Director Fischer talked with the students and bade them farewell.

WISCONSIN REGISTERS FARM NAMES

UNDER a new Wisconsin law, effective for the past two years, farmers are now in a position to register names for their farms, a system that appeals both to the senses of beauty and utility. The name may well become a trademark for the farmer's products. A large number of farmers in Marinette County have taken advantage of the law and the love of trees is as much reflected in the names as is any other sentiment. Such names as "The Oaks," "The Poplars," "The Pines," are common. The name "Oak Ridge Farm," at once calls up the picture of a long hill surmounted probably by a single oak. "Maple View Farm" may have a grove of maples in the prospect that the farmhouse faces. "Forest View" offers a similar suggestion. "Twin Oaks Farm" or "Twin Maples Farm" hardly need additional directions to guide the seeker. Various groves have given names to farms and the tree motif is also seen in "Beechwood," "Cedar View" and "Elmhurst."

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

WASHINGTON, D. C.

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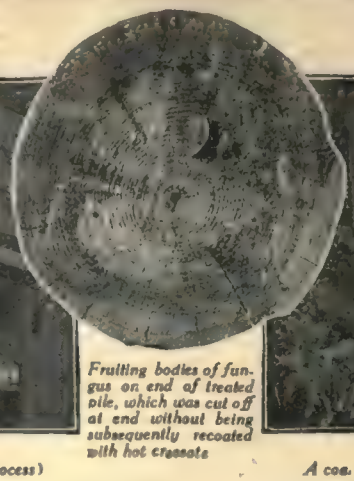
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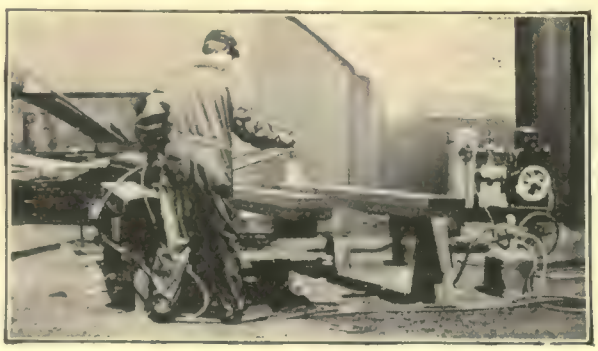


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EDITORIAL

THE FIRE SEASON

THE summer fire season of 1920 is, it is to be hoped, now a matter of history. So far as the western National Forests are concerned, the season has been an unusual one in several respects. A wet spring delayed the occurrence of any really serious fires until early in July, and gave rise to the hope that they were to be few and far between. Then came a period of dry weather which resulted in a rapid increase in the number of fires. The situation was particularly critical in Montana, Idaho, Washington, Oregon and California, where the development of widespread conflagrations was threatened. Fortunately, unusually high winds were not prevalent and rather general rains toward the end of August and the first of September virtually put an end to the danger of a catastrophe.

One of the interesting features of the season was the large proportion of fires caused by lightning. In western Montana and northern Idaho, for instance, lightning set no less than 1,200 fires, or approximately 80 per cent of the total number. These were so scattered and frequently so inaccessible as to render their control extremely difficult. So serious was the situation that in early August some 500 extra patrolmen and 1,200 fire-fighters were on duty at the same time. High winds and still drier conditions than those which actually existed might easily have resulted in a repetition of the holocaust of 1910.

Lightning was also responsible for many fires in Washington, Oregon and California. Here the experiments undertaken last year with the airplane as a means of fire patrol and fire reconnaissance were continued. While it is still too early to reach any final judgment as to the value of the airplane for these purposes, it has to its credit many instances of service rendered. In addition to detecting the occurrence of fires, it has been able to determine their exact location and area, the general character of material in which they were burning, and the best means of approach. Information of this sort has made possible the selection of fire-fighting crews of the right size and has saved valuable time in getting them to the scene of the fire.

Information is not yet available as to the acreage burned and damage done. It is known, however, that in less than three months it has been necessary to incur emergency liabilities aggregating about $700,000. This is over and above the much larger amounts spent annually by the Forest Service from its regular appropriations for the maintenance of a fire protection organization, the development of means of communication and transportation, and the purchase of supplies and equipment. The maximum expenditure, amounting to considerably more than half of the total, has been in western Montana and northern Idaho. Washington and Oregon come next, and California third. Wyoming and Colorado have escaped with the remarkably small total of approximately $3,500.

To meet a situation of this sort, Congress, in the face of a request from the Forest Service for an appropriation of $1,000,000 for emergency fire fighting, actually appropriated $250,000. A deficit of $450,000 has therefore already been incurred which must be met from funds appropriated and badly needed for other purposes, unless and until Congress sees fit to provide a deficiency appropriation. Last year, with a special appropriation of only $150,000, a deficit of nearly $3,000,000 was incurred. Under less favorable conditions, the situation this year, which passes for a relatively good one as fire seasons go, might easily have been equally bad. Will Congress never learn that in so vital a matter as the protection of our National Forests from fire it is true economy to appropriate at least reasonably near the amount that experience has indicated will actually be needed?

"THERE ALWAYS WILL BE LUMBER"

ONE of the lumber trade journals comments editorially as follows: "In spite of all that is heard about the difficulties of the manufacturers there always is lumber—AND THERE ALWAYS WILL BE LUMBER." Probably there will. We hope so at any rate. But the question is will there be enough lumber; what will be its quality; how far shall we have to transport it; and what will it cost?

Somehow, we cannot feel entire confidence as to the abundance of future supplies of lumber when we reflect that we are now cutting or otherwise destroying our forests more than four times as fast as they are growing.

The steadily increasing shortage of raw material in many important wood-using industries does not help to reassure us. We cannot be blind to the fact that the disappearance of our virgin forests, unaccompanied by any real attempt to replace them by trees of equal size and quality, is resulting in a progressive decrease in the amount of high grade material available.

We cannot help feeling that a community such as Minneapolis, which formerly cut 500,000,000 board feet of lumber a year, would be better off today if all of its sawmills had not disappeared and if it did not have to import from 80 to 90 per cent of the lumber which it now consumes from the Pacific Coast. We cannot avoid a suspicion that there is some connection between the depletion of eastern softwoods and the fact that redwood siding last summer retailed at $43 per thousand board feet in Eureka, California, and for $130 per thousand in Washington, D. C., in spite of the fact that the freight rate between the two places was only $8.50 per thousand. It even strikes us as significant that the same issue which contained the editorial already referred to should have called attention to "the remarkable development of American markets for foreign lumber," and to the fact that "imports of lumber have doubled and, in many instances, more than trebled in volume and value within the year."

The signs of the times are too clear to be misread. That "there always will be lumber" is doubtless true. But it is equally true that it will be available only in insufficient quantity, of poor quality, and at excessive prices, unless we mend our ways. If we are to avoid unpleasant consequences we shall have to take prompt action to substitute for our present hit-or-miss treatment of our forests a policy that will make and keep them productive.

HARDING FOR CONSERVATION

ONE of the noteworthy developments in the Presidential campaign has been Senator Harding's unequivocal support of forestry and other forms of conservation. Speaking to a delegation of Ohio editors on August 13, he urged the importance of forest conservation as a means of insuring an adequate supply of newsprint paper. The fact that we now import from other countries two-thirds of the print paper that we consume, whereas ten years ago we were self-supporting, emphasizes the soundness of his plea for "a forest policy which shall make us self-reliant once more." Particularly gratifying is his recognition that "permanent and ample relief must come by going to the underlying causes." It is a superficial view which attributes the present shortage of newsprint paper primarily to such factors as inadequate mill capacity and restrictions on the export of Canadian pulpwood. The fundamental cause lies deeper. In the last analysis depletion of the forests, both American and Canadian, from which the pulp and paper industry draws its supply of raw materials is the real root of its difficulties.

A few days later, at a picnic of retail lumber dealers, Senator Harding showed his appreciation of the effects of timber depletion on other industries and on the nation as a whole. After calling attention to the steady decrease in the forest resources of the entire eastern United States and to the effect of high lumber prices, due in part to "the very manifest diminution of supply," in halting home-building, he added that "no one can be blind to the fact that . . . we have been drawing on our natural timber supply without a thought of the future. . . . But we have learned the lesson now and we have not only to conserve, but we ought to have a national policy of conservation and reforestation. . . . I can think of no forward look in relation to the good fortunes of America which does not contemplate a forest policy which will assure us the essentials in the lumber line for all our constructive activities."

All of this is admirably and strictly in line with his formal declaration to a group of Governors on August 31, in favor of the conservation of all of our natural resources. It is also gratifying that Senator Harding does not attempt to make a political issue out of conservation. There is no reason why this should not be one subject on which both the Republican and the Democratic candidates are in perfect accord. Opinions may differ as to details of procedure, but the need for the protection and perpetuation of our forests is so clear and so urgent that every forward-looking American, irrespective of party, should find himself in agreement with the essential principle of preservation through wise use.

AN UNSOUND DOCTRINE

GOVERNOR PHILLIP'S interesting address at the Decennial Celebration of the Forest Products Laboratory on "Legislative Measures for Forest Conservation," contained one important recommendation with which foresters and conservationists disagree. In effect this was a disclaimer of any responsibility on the part of the individual States to conserve their forests, on the ground that forest production involves a long-term investment of doubtful financial return which it is unreasonable to expect the States to undertake, and that forest products are not for the use alone of the State in which they are grown, but of the entire nation.

If this view were generally accepted and applied it would effectually put an end not only to all State forestry activities, but to all private forestry activities. For if the States cannot afford to practice forestry and are without responsibility in the matter, private owners are still less so. The entire task is thus shifted to the shoulders of the Federal Government, practically all of the forestry programs now under discussion are knocked in the head, and any effective attempt at the conservation of the great bulk of our forests, four-fifths of which are in private ownership, is postponed until an indefinite future.

Fortunately, Governor Phillip's statement was immediately challenged by other speakers both at the decennial celebration and at the reforestation conference of the wood-using industries. Thus Colonel Greeley came out with the flat-footed statement that, while the growing of timber is a duty of the National Government, "it is a responsibility that the States also share. It seems to me that Wisconsin, Minnesota, and Michigan have an obligation to their own citizens, to their own welfare, their own future taxable property, and future industry to take an active hand in this proposition of growing timber. I am for State Forests as well as Federal Forests."

This is sound doctrine. Leaving altruism out of consideration altogether, the States, from a purely selfish point of view, have a profound interest in keeping their forest lands productive. Idle lands create no riches. Productive lands support a host of forest and wood-using industries, and contribute in countless ways to the welfare of the entire community. All experience contradicts Governor Phillip's assumption that forestry is an unprofitable venture. Certainly those States which have tried it have not found it so. Pennsylvania, with its present State forest area of some 1,100,000 acres is making active plans to increase this to 6,000,000 acres. Massachusetts has just embarked on an ambitious program of forest acquisition. New York is steadily increasing its holdings.

To claim that State forestry is an unwise venture and that the States have neither interest nor responsibility in the conservation of their natural resources is to fly in the face of both history and logic. To attempt to put such dangerous doctrine into practice is to threaten the prosperity of the very people whom it pretends to protect. If Wisconsin is wise it will heed the experience of other States and other countries by embracing the first opportunity to enlarge its present holdings of State forest lands and to adopt a comprehensive and progressive program of State forestry in general.

WHERE WE STAND IN FOREST RESEARCH

THE recent bulletin on North American Forest Research compiled by the Society of American Foresters and published by the National Research Council constitutes a real contribution to our forest literature. Prepared primarily to serve as a clearing house of information on current investigative projects, it serves also as a record of progress and a promise of future accomplishment.

Systematic forest research in North America had its beginning as recently as 1908, when the Fort Valley Experiment Station was established near Flagstaff, Arizona. In 1909 came the establishment of the Forest Products Laboratory at Madison, Wisconsin, and in 1915 of the Forest Products Laboratories of Canada at Montreal. Today, some 520 projects, covering the entire field of forestry are being conducted by a wide variety of agencies. These include not only the Federal departments of Canada, Newfoundland and the United States, but from 40 to 50 State, provincial, college and corporate organizations and individuals. The comprehensive statement of investigative activities furnished by the bulletin will be indispensable to those actually engaged in the work, and of marked value to all others interested in the progress of forestry.

While the bulletin contains no mention of expenditures, the results already accomplished and the extent of the work now under way will be a source of wonder to those who are familiar with the very limited funds available for research. The action of Congress last spring in reducing by 36 per cent the already meagre appropriation for experiment stations and other forest investigations is a striking example of the way in which research has been crippled by a niggardly and unprofitable economy. It is to be hoped that the more thorough understanding of the character, importance and possibilities of forest research which will undoubtedly be stimulated by the present bulletin will lead to its support on a more adequate scale. It will be of little avail to adopt the most progressive possible national forestry policy if its practical application is not based on thorough research in silviculture, forest products, forest economics and related lines.

"A DOCUMENT WHICH EVERY LUMBERMAN SHOULD READ"

THE editor of the Lumber World Review refers to the Forest Service report on Senate Resolution No. 311, more commonly known as the "Capper Report," as a "document which every lumberman in the United States who has a lick of interest in his affairs—as related to the Government—should purchase and read." AMERICAN FORESTRY would like to enlarge the editor's circle of readers to include every one interested in the welfare of the nation. The review of the report which appears elsewhere in this issue gives some idea of the principal conclusions reached. Nothing less than a complete reading however, is sufficient to give the average citizen an adequate conception of our present timber situation. Unlike many Government publications, it is clear, concise and thoroughly readable from cover to cover. It is the most thorough study of the problem of our timber supply and timber depletion from an economic point of view which has not yet been made, and the facts presented furnish an incontrovertible argument in favor of the immediate adoption of an adequate forest policy for the nation.

FORESTS IN THE SAND HILLS

BY FRED R. JOHNSON

U. S. FOREST SERVICE, DENVER, COLORADO

THE weary traveler passing through the uninteresting sandhill region in western Nebraska on the Billings Branch of the Burlington Railroad is astonished after hours of gazing at bare sandhills, occasional sod ranch houses, and groups of cattle, to see before him green hills covered with evergreen trees. There is a rush to the south side of the train, a series of questions, and then a sign looms in view:

"Bessey Nursery,
Nebraska National Forest."

Are those trees natural growth; were they planted; what kind are they; why should we have a forest in these desolate hills, etc? For years a greater part of western Nebraska was known as the Great American Desert. A few ranchers occupied the river valleys and lower lying land close to lakes where they could cut enough hay to winter their cattle, which grazed in the adjacent hills. Other parts of the hills were used by herds of long horned cattle that were trailed across country from Texas and then sold in the fall at Missouri River markets. But this business proved unprofitable and twenty years ago there was very little use of the sandhills.

About that time a movement, led by Dr. Charles E. Bessey, Dean of the Botany Department of the University of Nebraska, was started to utilize a portion of these sandhills for the purpose of raising timber for the prairie states. This was shown to be practicable from the growth made by a plantation of jack, Scotch and yellow pine established in 1891 on Bruner Brothers' ranch in Hot County, Nebraska, by the Federal Division of Forestry. It was felt that the production of timber and the grazing of cattle might be carried on together, as in much of the mountain country, and the land would thus be put to a higher use. Nebraska has almost as small a forest area as any state in the Union and large quantities of material are needed anually for use on ranches and on the excellent farms in the eastern part of the state.

Accordingly, in 1902, after an examination of the land in this region by forest experts, an area of 206,000 acres was set aside by Presidential Proclamation—0.4 of 1 per cent of the total area of the state, reserved for raising timber.

In 1903 the first plantation was established with jack pine seedlings pulled from the forests of Minnesota. These trees now range from 20 to 25 feet in height and forest conditions prevail, the grass having been shaded out and replaced by a litter of pine needles, and the lower limbs of the trees are falling off. A comparison with the jack pine plantations in Holt County, previously men-



VIEW FROM LOOKOUT TOWER, NEBRASKA FOREST

This shows the system of fire breaks, the nature of the country, and yellow pine planted in 1914 in the foreground, with older planting in the distance. The plantations are divided into units of about 160 acres each.



JACK PINE PLANTATION

Established in 1911 in Nebraska Forest. The rows of jack pine are now rapidly closing. Yellow pine planted in 1911 in the foreground.

tioned, indicates that three or four posts can be cut from each tree twenty-five years after planting. If 800 trees per acre reach maturity out of 1,500 planted and posts are worth four cents each on the stump, receipts from the sale of the posts would amount to $128. Assuming a cost of $16.00 per acre for planting and that it costs 15 cents annually per acre for protection on this intensively managed tract and compounding these costs for the period, net receipts of $89.00 result, or $3.56 per acre annually for each year of the life of the stand. This is a much higher return than can be secured from this land when used for grazing cattle.

In 1903 a nursery was started near Halsey, which now has an annual output of from one and a half to two million trees. Western yellow pine (*Pinus ponderosa*) and jack pine (*Pinus divaricata*) are the most successful trees for this region, many others having been tried out and found not suited. Seed is sowed in the nursery in beds four feet wide and the little trees grow here for two years. Then they are transplanted or set out in nursery rows for another year's additional growth before they are ready to plant in the hills.



YELLOW PINE PLANTED IN 1909

A high survival has resulted and the trees are making a wonderful growth. This is also in Nebraska Forest.

The success of the work near Halsey resulted in Nebraska people requesting Congress to establish a nursery and to extend forestation work to the Niobrara Division of the Forest. A site was secured on the

Niobrara River and in 1915 ground was broken for nursery purposes. The work here will be rapidly pushed along the same lines as at Halsey.

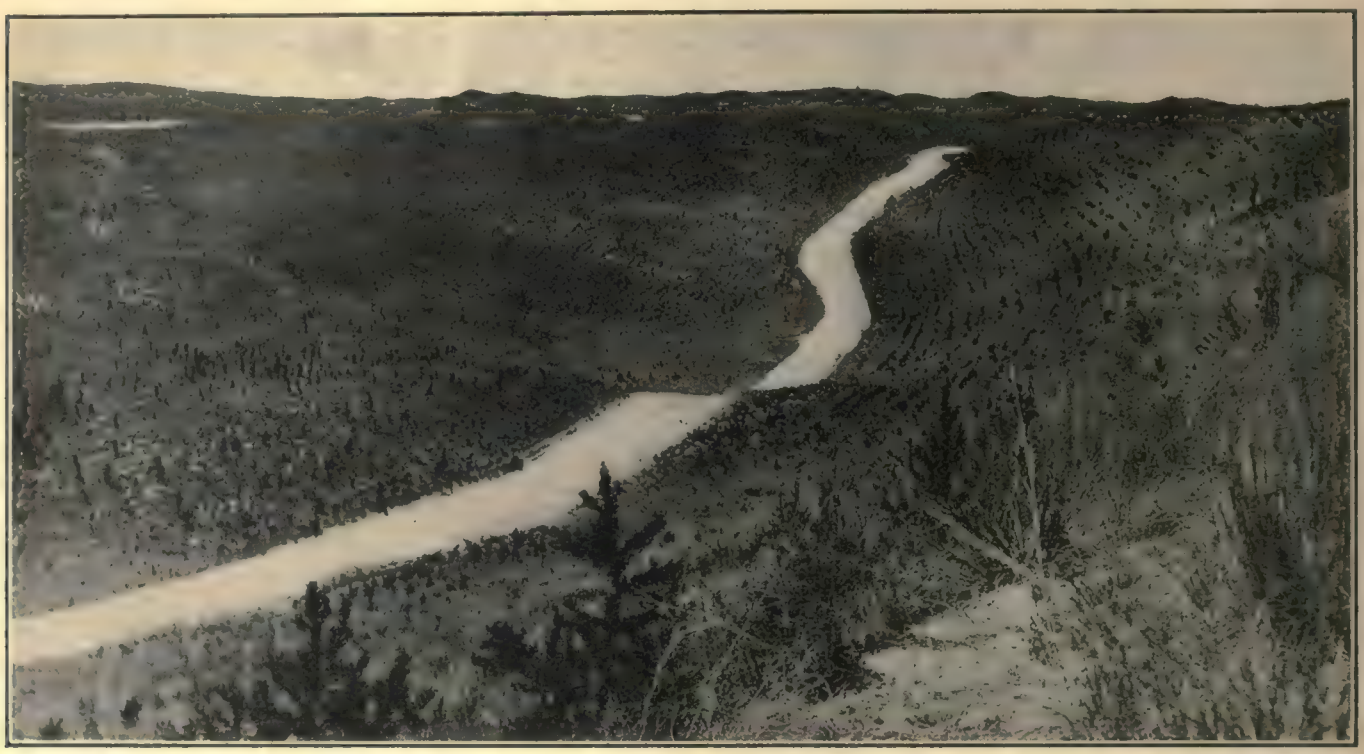
The trees are dug in the spring and hauled immediately to the planting site. Temporary camps are established throughout the hills. A barn accommodating forty horses, a mess house in which fifty men can be fed, and bunk houses accommodating twelve men each, are built in sections so that they can be moved conveniently every four years. Wells, 100 to 150 feet deep, must be sunk for water. One section (640 acres) is planted annually and the camps are arranged so as to be centrally located.

The trees are planted in furrows, a side hill or reversible plow being used for this purpose. A machine called a trencher, which consists of a V-shaped piece of iron attached to a plow beam, follows the plow and makes a slit in the middle of the furrow into which the roots of the trees are placed. The planter closes the slit with a thrust of his foot. A crew of six planters will set from twelve to fifteen thousand trees per day. About 35 horses and 45 men are used in the average camp during the planting operation. In addition about fifty men are employed at the nursery digging trees, transplanting, sowing seed, etc. The spring operation lasts from a month to six weeks.

Approximately 3,500 acres have been planted successfully at a cost of about $16.00 per acre. From 1,500 to 1,800 trees are set per acre. At present survivals of fifty to sixty per cent can be expected in the driest season, while under favorable conditions ninety per cent of the trees will live. Losses have been caused by drought, pocket gophers and fires. The pocket gophers bury the small trees with the dirt they push out from their runways and also eat the roots of the larger trees.

To protect the plantations from fires they are divided by fire lines into units of about 160 acres. These consist of two plowed strips—a rod wide—placed from 100 to 150 feet apart. In the fall the grass between the plowed strips is burned off. This system has proved very effective and there have been no fires in the plantations since 1910.

The remnant of Nebraska's once large herds of deer are to be found on this forest. Frequently they are to be seen taking advantage of the shelter afforded by the young forest. Thus the future forest, located in the midst of a treeless country, will be a game refuge, a future playground for people in the prairie country, and a source of timber.



LOOKING DOWN ALONG THE FIRE LINE

Jack pine, established in 1913, to the right of the fire line; yellow pine, established from 1907 to 1909, to the left of the fire line. Nebraska Forest. A few single fire lines have been constructed for use in back firing or for stopping ground fires.

PLANTING TREES IN FARM GULLIES

PLANTING trees in farm gullies is a reclamatory measure advocated by the Forest Service of the United States Department of Agriculture. The results are of two-fold advantage, as not only are the trees valuable in themselves but their presence stops the gully erosion. In the north Atlantic and mountain states and in the Mississippi Valley the locust is well adapted for this use as it has a large root system, grows rapidly and makes one of the most lasting woods for fence posts. The little trees may be dug up in locust thickets or obtained from commercial nurseries.

In other sections the native shortleaf pine is one of the best varieties for reclaiming gullies as it exerts even when young a marked influence in holding the soil. When set out in gullies, its growth is fairly rapid and in a few years it forms a complete protective cover.

FISH IN FOREST STREAMS AND LAKES

BY R. W. SHUFELDT

(PHOTOGRAPHS BY THE AUTHOR)

WERE it not for our forests there would not be many fresh water fish—or to carry the illustration further, if our forests disappear, so will, in large part, those fine streams which fish frequent and fishermen love. The subject of recreation in our forests, which is coming more and more to the fore, includes fishing, and this article is written to give some account of some of the fish which are caught in streams that run for miles through forest areas, or in lakes and ponds located in the very depths of timbered country. Beyond a brief description of the Striped Bass, which runs far up some of our larger rivers to spawn, no mention of marine fishes will be made here; of these there are many hundreds of kinds inhabiting the coastwise waters of the Atlantic and Pacific Oceans, as well as the Gulf of Mexico. The writer has caught many of these all the way around the coast line from Long Island Sound to Galveston Harbor, Texas. But they do not interest the lover of the forest, while an account of our trout, our pikes or pickerel, our catfishes, basses, and others that he knows more or less about from having taken them and handled them himself, would naturally appeal to him.



FOREST LOVERS IN CAMP

Figure 1. Evening on the borders of an Adirondack Lake with a mess of fish for dinner.

With but few exceptions, all of our fresh-water fishes are represented by several species making up any particular genus; for example, the catfishes, sunfishes, and trout all illustrate this fact, as well as the herring group and others that do not particularly interest us here. Dr. David Starr Jordan, our greatest authority on American fishes, long ago published the fact that "the catfishes abound in all the fresh waters of the United States east of the Rocky Mountains. The species of the three genera, Channel Cats, Horned Pout, and Mud Cats, which constitute the bulk of the family as represented in North America, all reach a length of from one to five feet, and all are food fishes of more or less importance. One of the Catfishes, the Mississippi Cat, is our largest fresh-water fish, weighing upwards of one hundred and fifty pounds; and two of the others, the Mud Cat and the Great Lake Catfish, reach a very considerable size." In quoting this paragraph, the liberty of substituting the common names for the scientific ones has been taken.

Our "Bull-head" is the best known species of the family, and it is the common form of cat of the New England and Northern States. Many know it as the "Bull-pout," "Horned Pout," and sometimes as the "Minister." A number of years ago they were successfully introduced into the rivers of California, where they are now quite abundant; an excellent picture of one is here produced in Figure 3.

It is great sport to fish for catfish on a rainy night, using small pieces of raw beef for bait, scented with a drop or so of the tincture of assafoetida to attract them. Among the water-lilies is a great place to try it—a bamboo pole and line is all the rig necessary; but to keep dry, one should be dressed in rubber from head to foot. When the catch runs at three or four pounds to the take—to get a good mess does not carry one very far into the night; and if properly cooked over the campfire, they are more palatable than some people represent them to be.

Speaking of catfish, a great place to fish for them is in any suitable locality in the Potomac River (Fig. 4); indeed, that stream is noted for the great variety of fishes that are indigenous to it. Among others may be mentioned two or three species of sunfishes (Figs. 6 and 7); white and yellow perches; black bass; striped bass, and shad in the spawning season; crappie, eels,

carp, and many others.

As most people know, the black bass are of two species—the Small-mouth Black Bass (Fig. 2) and the Large-mouth Black Bass; both belong to the genus Micropterus, and are readily distinguished through the fact that in the last-named form the angle of the gape of the mouth is back of the imaginary vertical line from the center of the pupil of the eye upon either side. So gamy are these fish that, on the lakes in the Northwest and elsewhere, they are known as the "game-fish of the North," and most of our anglers prefer to fish for them above all other kinds. In 1868 the writer landed many a one from his boat on either of the united lakes, La Belle and Fowler's, in central Wisconsin,—that is, at Oconomowoc. They made superb fishing there, for the waters of those lakes are deep and clear; the fish are wonderfully gamy; and to catch one weighing six pounds happened often enough to make the sport most exhilarating. These fish have received many English names—so many in fact that it would be a waste of time and space to attempt to enumerate them here. Both have a wide range over the greater part of eastern United States, and at this time both have been introduced into western waters.



THE BLACK BASS

Figure 2. In a large part of the United States there is no better known fresh water game fish than the Black Bass, nor one more generally sought after. There are two species of Black Bass in this country, namely the large and the small-mouthed. The one here figured is the small-mouth, and it may be identified by the angle of the jaw being below the eye and not reaching back of it.

Black basses are very satisfactory fishes to introduce into new habitats. Dr. Goode has pointed out that "a few young bass will multiply so rapidly as to stock a large lake in five years. The Potomac and its tributaries swarmed with them ten years after their first introduction." It is Mr. W. W. Shriver, of Wheeling, West Virginia, who deserves the credit of having planned and carried out the enterprise of transferring this fish from the Ohio River to the Potomac. This was as long ago as 1853, and the present generation of fishermen should remember this fact.

The published history of the Black Bass is quite extensive and interesting; but at this point we must pass to the notice of some other fishes. In doing so, however, it will be well to note that we have, in the inland waters of the United States, a long list of fish that are known under the name of bass of one kind or other. Not only is this true, but those fishes as a rule all belong in very different families, and in most instances are not especially closely affined. *The* bass of the South is the Red Fish; then we have the Striped Bass (Fig. 5), which has several vernacular names besides. All of our sunfishes, of which the common Pumpkin-Seed or Tobacco-Box is an example, have all been designated as various kinds of basses; and there is the Brassy Bass, the Calico Bass, often confused with the Crappie; the Silver Bass is another name for the "Moon - eye," and many other examples could be given.



THE CATFISH

Figure 3. Catfish are usually caught with hook and line at night, and, of its kind, the sport is not to be despised. This is one of our smaller "cats," for some of the species are giants in their way, specimens of the Great Mississippi Catfish, for example, weighing as much as 150 pounds.

Many people—and forest-lovers among them—by no means despise such sport as there may be in angling for any of the various species of our common Sunfish (Figs. 6 and 7); although be it known, as a rule these species are generally regarded as *the* game fish of our small boys. The common sunfish is an abundant form in most lakes and rivers, from the Great Lakes to southern Georgia. Dr. Kirkland has given us some very

interesting points on the breeding habits of this species, which he very truly says "prefers still and clear waters. In the spring of the year the female prepares herself a circular nest by removing all reeds or other dead aquatic plants from a chosen spot of a foot or more in diameter, so as to leave bare the clean gravel or sand; this she excavates to the depth of three or four inches, and then deposits her spawn, which she watches with the greatest vigilance; and it is curious to see how carefully she guards this nest against all intruders. In every fish, even those of her own species, she sees only an enemy, and is restless and uneasy until she has driven it away from her nursery. We often find groups of these nests placed near each other along the margin of the pond or river that the fish inhabits, but always in very shallow water; hence they are liable to be left dry in times of great drought. These curious nests are most frequently encircled by aquatic plants, but a large space is invariably left open for the admission of light."



WHERE WASHINGTON FISHED

Figure 4. One of the finest rivers in which to fish for Black Bass is the Potomac River. The scene here shown is at Miller, Virginia, less than a mile west of Mount Vernon. General Washington and his friends fished off this point—more than a century before the little boathouse was built there.

The writer has seen these sunfishes breeding in many waters in a number of the States east of the Mississippi, and their habits in this respect vary considerably, although essentially similar. Occasionally it will be observed that the female fish, where the bottom is pebbly, has the habit of pushing the pebbles away from the area she has chosen for a nest, and in so doing forms a circlet of them about the latter that causes it to appear more like a "nest." As to the latter always being in shallow water, as Doctor Kirkland observes, we may say this only holds true where there is no great rise and fall of tide. For example, those who have studied the breeding habits of the Common and Long-eared Sunfishes (Fig. 6) in the Potomac, near Washington, know very well that, in such localities as the inlet at Four Mile Run and similar places, the tide may rise many feet; and that at high tides, where the sunfishes have built their nests close to the edge of the pond or inlet in shallow water, these will often be far from the shore and in comparatively deep water. So far as known, all other species of our sunfishes of this and closely allied species possess the same breeding-habits.

It may be of interest to the readers of AMERICAN FORESTRY to know that the beautiful Long-eared Sunfish here shown in Figure 6 inhabited one of the large tanks in "The Grotto" at the United States Fish Commission Building in Washington as long ago as 1900. It is by no means an easy matter to photograph active fishes like this Long-eared Sunfish while it is swimming at large in a tank containing three or four hundred gallons of water. The day the photograph was taken was a very warm and sultry one in July, and the lens of the camera had to be focussed on some imaginary spot near the center of the tank, with the hope that the fish *might* come to rest there sooner or later as it swam about its home. After waiting for an hour or more, this actually happened, and an instantaneous exposure

accomplished the desired result. Several years thereafter the writer was well repaid for his patience and labor, as this photograph, grouped with others of fish and various living creatures, was awarded a prize at the Exhibit of the Royal Photographic Society of Great Britain, held at Liverpool. The Common Sunfish shown in Figure 7 was secured by the writer in one of his own aquaria the day after it was caught in the Potomac River.



THE STRIPED BASS

Figure 5. It is said that this fish—the Striped Bass—may attain a weight of forty pounds, while market specimens seldom range over half of that. Naturally, there is a large literature on this famous food fish, which is a species ranging all the way round the eastern and southern coasts of the United States.

When properly cared for, these sunfishes may be reared in aquaria from little bits of specimens less than



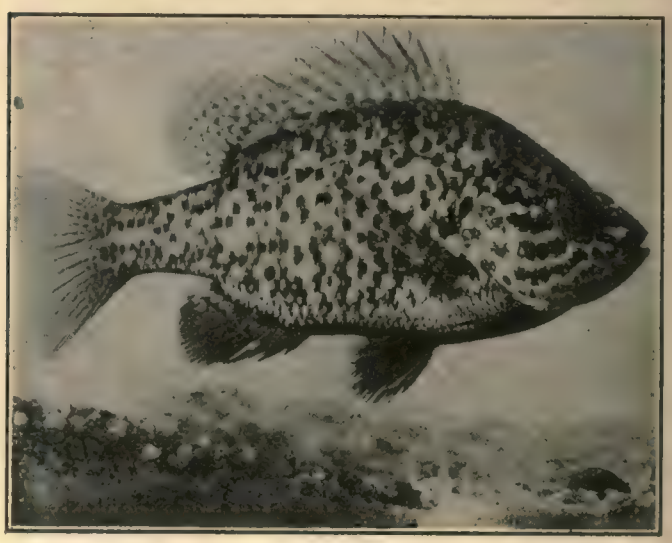
THE SUNFISH

Figure 6. This long-eared Sunfish is one of the most beautiful species of its genus. Though not an ear, it receives its name from the black flap above the gill-slit. All the streams in this country that empty into the Atlantic and the Gulf are abundantly supplied with this species of sunfish.

two centimeters long. Two such fish are at hand at this writing, swimming contentedly about in a medium-sized aquarium; each is now more than three times the size it was when taken from its river home, and each has begun to assume the pretty colors of the adult of the species. In fact, an old male sunfish of the Common variety, when in full color, is really an exceptionally beautiful fish. Rarely do they exceed a pound and a half or two pounds in weight, being easily captured with angling worms and the simplest sort of rod, hook, and line, with the usual float and light sinker.

Of all our best known fishes—that is food fishes—no one is a greater favorite than the White Perch—*Roccus americanus* of science. It is one of the best "pan-fishes" known, and the most abundant one in the markets of New England and northern Atlantic States. Economically, our Striped Bass is doubtless the most important fish where it ranges; but beyond question this White Perch stands next on the list. (Fig. 9). It is wonderfully abundant in the streams that empty into the bays along the Atlantic Coast, as far south as Florida.

As long ago as 1878, we read in the Report of the United States Fish Commission that "after the middle of June the White Perch are found in localities widely different; even waters with a dense growth of lily and river weed are found to contain them in apparent health and vigor—spots where the Rockfish could not live a day. Still later in the summer, as the young Perch become quite strong and of some size, the river, although



ANOTHER SUNFISH

Figure 7. Another beautiful Sunfish is the common species—the "game fish" of boyhood days. It has many other names, as "Pumpkin Seed," "Tobacco Box," and "Sunny." Sunfish of this species are found as far south as the streams of Georgia and westward to the Great Lakes. As a "pan-fish," it has furnished many a forester a breakfast.

in and about tide-water, fairly teems with them. At this season they go in schools, sometimes of large size. Twelve, fifteen, and twenty dozen August Perch have been known to be taken with a line in as short a time as from three to five hours. Fishing in this way, a

line with a half dozen hooks is used, and worms, sturgeon spawn, or live minnows are used as bait. These schools of small perch were supposed to be the broods of the preceding May, and that they kept together until late in November. They pass down to the salt water and there separate. Larger adult fish are not as restless as these smaller ones; are found in deeper water, and usually in tide-waters."

A two-pound White Perch is a big one; and, as a rule, they run more than half that weight to the catch. Where forest lovers are most likely to meet with this fish will be during certain seasons of the year in those streams along the Atlantic Coast running soon into brackish water, and where extensive timberlands exist. They are easy fish to capture, for they eagerly take the right sort of bait, and few kinds make a better breakfast for the hungry woodsman. White Perch, when taken in salt water creeks, are found to be of a much darker color; but it must be remembered that it is identically the same species as the silvery white ones caught in clear ponds and streams of fresh water.



A HAUNT OF PIKE AND PICKEREL

Figure 8. Pikes and some other fishes love such a pond as the one here shown, especially should it be connected with some clear, though sluggish river. Down in the dark, right hand corner of this pond, where the leaves of the pond lilies float, is an ideal retreat for a pike or pickerel.

From the viewpoint of one who possesses the necessary knowledge of the science of fishes, together with their structure and true affinities, the fact is patent, upon comparing all these species we call "perch" in this country, that we really have in our fish fauna but one true perch, and that is the Yellow Perch. This favorite of anglers everywhere has quite a wide range, occurring as it does in nearly all the streams of New England, westward to include the system of the Great Lakes; while east of the Allegheny Range and southward to northern Florida, it is very abundant in certain localities. At the proper seasons of the year we may note many of them for sale in the markets of the cities, in the northeastern parts of the country. This perch rarely exceeds two pounds in weight or measures much over a foot in length, the average being rather under than over these figures. Where they exist in numbers, it requires but a short time to catch a good mess for breakfast, as they are voracious feeders and bite eagerly when minnows or angling-worms are used as bait.

In many localities over their range, these perch are very abundant and much sought after, the largest fish being caught in various localities in the Great Lakes, where a two-pounder is not a rarity. As a rule they are heavier when taken in the Lakes than those obtained in the rivers running into them. The example of the Yellow Perch here shown in Figure 10 was a Potomac River specimen and purchased in the Center Market of Washington. It weighed but half a pound; and, although the markings were not very pronounced, still it gives an excellent and correct

idea of the appearance of this widely known fish.

Passing to the Pike family, we have a very interesting member of it in our common Pike or Pickerel—a fish indigenous to both Europe and America, and familiar to anglers in all parts of its habitat; it also occurs in some of the waters of northern Asia. It is a relative of the mighty Muskellunge, and still other species are members



THE WHITE PERCH

Figure 9. One of our most important food fishes is the White Perch; in fact, in this respect it is only exceeded in the East by the Striped Bass. White Perch (*Roccus americanus*) make attractive aquarium fish; the one here represented is from a photograph made by the writer at the United States Bureau of Fisheries, where it occupied one of the large tanks.

of the same genus, as the Common Pickerel and the two species of Brook Pickerel. These last two are so small that fishermen pay them but scant attention.

Muskellunge sometimes run up to one hundred pounds in weight, and to land one with rod and line is a feat not to be forgotten in a lifetime. The writer once witnessed a fight with one on Silver Lake in Wisconsin, which, when captured, was found to weigh but 25 pounds. The gentleman who took it was in an open, light canoe, and handled a delicate steel rod with the finest sort of a reel and line. To witness the skill with which he finally brought that big fish to gaff was a sight never to be forgotten; all of three-quarters of an hour was required to do it. The writer has taken Common Pike in many waters, as in the streams of New England, in the lakes of the Catskills, and in various sections of the Northwest. Sometimes, when afield without a rod, a fine fish has occasionally been taken with a shotgun; for, as we all know, a pike has the habit of resting near the surface of the water as motionless as a stick, so that it is an easy matter to shoot it; but, it must be admitted, it is not a very sportsmanlike procedure. Still, with no tackle at hand, and one has no fish for breakfast in a forest camp, we must believe that such an act would be more or less justifiable and that the forester would be forgiven for it.

Pike are usually found—especially in New England—in deep, still mill-ponds, where the water is quiet and water lilies grow in patches of greater or less extent. Behind these an old pike will lie in ambush a few inches below the surface, awaiting the passage of minnows or "shiners;" upon these he has no mercy, seizing them in his powerful jaws, and devouring probably several dozen in the course of twenty-four hours. During the spawning season the fish are found in pairs; but at other times they live singly and at greater or less distances apart. They may be taken with the trolling-line, or, better still, with live minnows and any ordinary tackle. On a big mill-pond that has not been over-fished, six or eight big pike may be taken with the rod from a boat in the course of a forenoon's fishing. One should scull cautiously through the open water, and cast the bait over into the places where the lily-pads are, and where the pike are in concealment. It is remarkable to note the voracious manner in which one will rush through the water to seize a minnow struggling on the hook; and when hooked, the fish, if a big one, will put up a lively fight in its efforts to escape being taken, often springing clear of the water in its attempts to shake the hook out of its mouth.

An even more gamy fish is our common Brook Trout—a species known to anglers throughout the world. An excellent picture of this famous game-fish, and the sort of brook wherein it may be found are here shown in Figures 12 and 13.

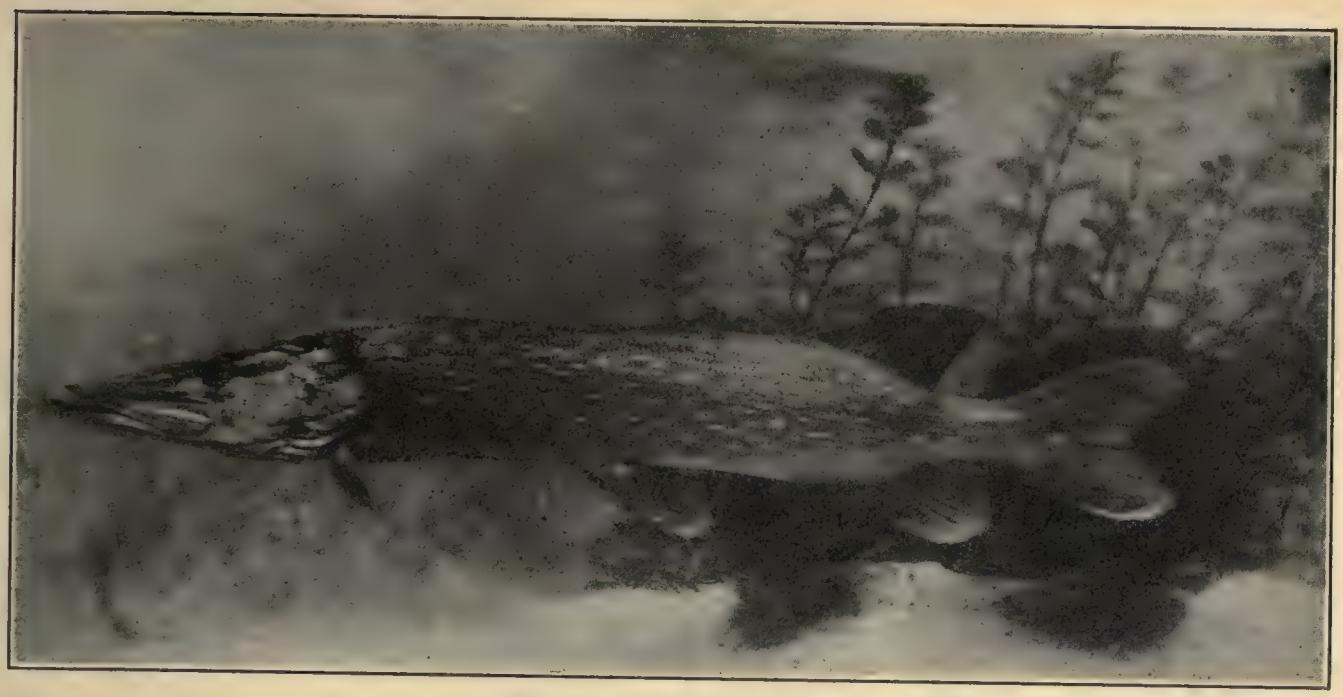
With respect to the distribution in this country of the Speckled Trout—the *Salvelinus fontinalis* of science—Doctor Goode has said that the "Speckled Trout has its home between latitudes 32½° and 55°, in the lakes and streams of the Atlantic watershed, near the sources of a few rivers flowing into the



THE YELLOW PERCH

Figure 10. Although not an especially gamy fish, the Yellow Perch is one of the anglers' standbys from boyhood up. During the fishing season, this perch is exposed for sale in great numbers in our markets, and it is esteemed very highly as a food fish.

Mississippi and the Gulf of Mexico, and in some of the southern affluents of Hudson's Bay. Its range is limited by the western foothills of the Alleghenies, and nowhere extends more than three hundred miles from the coast, except about the Great Lakes, in the northern tributaries of which Trout abound." It is a fish with remarkable habits, and a long and more than remarkable history. No end of books have been written about its natural history



THE QUICK AND FIGHTING PIKE

Figure 11. A gamy group of fishes are the Pikes, Pickerel and their various congeners of the lakes and streams in many parts of the country. In so far as animal food is concerned, the Pike is practically omnivorous, as it will devour anything it captures, even small-sized specimens of its own kind.

and the art of angling for it. The distribution of the species is largely controlled by the temperature of the water, and they constantly change their habitats to maintain the degree of heat most agreeable to them. "Their daintiness, shyness, cunning, and mettle," says Goode, "render them favorites of the angler, who lures them into his creel by many sly devices. The most skillful fisherman is he who places before them least obtrusively the bait which their momentary whims demand, or a clever imitation thereof." In many places Trout become domesticated, and come as fully under the control of their owners or caretakers as do cats and dogs; this is



A TYPICAL TROUT STREAM

Figure 12. Brook Trout are often found in little inland streams, such as the one here shown, in many parts of the New England and Middle States, and trout fishermen acclaim the sport as the best that can be had with rod and reel.

largely practiced by fish-culturists in England—at least this was the case in earlier times, and it is fair to presume that it is still maintained.

Trout vary greatly *within the species,* according to the nature of the waters they inhabit, the variations being manifested in their color, size, form, and fin-development. As to their weight, Mr. Hallock, a famous American fisherman, claims to have known of one that weighed seventeen pounds, while as a rule they do not run over three or four pounds.

Through the energies of the U. S. Bureau of Fisheries and similar establishments under the control of several of the States, many of our inland waters are kept abundantly stocked with this valuable game fish as they are, as a rule, captured by anglers everywhere, although by no means a regular fish of the markets.



THE BROOK TROUT

Figure 13. There is quite a long list of Trout that inhabit the streams and lakes of the United States; but among them all, no greater favorite than the Brook Trout. Brook Trout have often been kept in the aquaria of the United States Fish Commission at Washington, and here is a beautiful specimen of one photographed there by the writer.

BEWARE OF THE EUROPEAN SATIN MOTH

AN insect not heretofore reported in the United States has been found at the Medford and Malden line by the employes of the Metropolitan Park Commission. This insect is known as *Stilpnotia salicis,* or the Satin Moth of Europe. This name was undoubtedly given because the moths are pure white and the wings have a satin-like lustre.

Specimens of the caterpillars of this insect were brought to the Gipsy Moth Laboratory by Mr. A. N. Hubberly, Superintendent of the Middlesex Fells Reservation, with the statement that they were feeding heavily on poplar trees along the parkway. The insect was apparently not a native species, and proved to be the European species above mentioned. The center of the infestation is in the triangle at the Malden and Medford line bounded by Pleasant Street and Fellsway East and West. The trees in the Fellsway have been sprayed recently, but the caterpillars are now full-grown and many of them are entering the pupal stage. The full-grown caterpillars are about an inch and a half in length and of a yellowish color with prominent white blotches on each segment of the back, which makes them very conspicuous on account of the colors, and they are quite different from any caterpillars that are found in this region. The injury to the trees is caused by defoliation by the caterpillar and the amount of damage likely to occur cannot be accurately measured at this time, as no areas are now heavily infested, though the insect was found in thirty towns north of Boston during a three-week period.

European writings indicate that this species attacks poplar, willow, oak and other trees and that it occurs in the British Isles, Italy, Spain, Germany, Southern Europe and Eastern Asia. The poplars have been eaten more freely than any other trees in the Medford infestation. There is danger, however, that this insect might seriously attack other valuable shade or forest trees if it becomes firmly established. The moths fly well and immediate efforts are being made by the Metropolitan Park Commission and the State Forester's Office to destroy as many of the caterpillars and pupae as possible, so as to prevent large numbers of moths emerging and heavy migration to adjoining territory.

The United States Bureau of Entomology will make a study of the life-history and habits of the moth and an attempt to determine the extent of the infestation.

WHAT IS RECREATION'S NEXT STEP?

BY ARTHUR H. CARHART

AMERICA is recreation hungry. The appetite of the public seems so whetted for outdoor play that to satiate it has become a Herculean task. Ten years ago going on a pack trip in the mountains was a hardship braved only by bolder spirits, but the taste for the outdoors has so developed among all peoples that girls and women, clad in sensible khaki outfits, are almost as generally present in the vacation camp of a pack outfit as are men. Auto trips of a thousand miles a decade past were material for feature stories in the newspapers. Today Bill Smith packs his wife, children three, tent, dog, skillet, fishing tackle and safety razor in the family gasoline chariot and goes, not one, but several thousand miles, visiting many cities, camps and playgrounds on the way. And the present time is not the end of this chasing of the rainbow of recreation. Unlike the spectrum colored bow with its never-found pot of gold at the end the recreation lure leads one to true treasure. Health, happiness, knowledge, appreciation of God's outdoors, and a love of our own native land are but a few of the rewards for the man or woman who goes into the field of outdoor play to there be re-created.

Each year the numbers thus getting from under roof and outside of brick walls are greater. It is easily explained. Everyone who has once tried the life never quite gets away from its appeal and as a missionary converts others to try it just once. So every season sees the older gypsies on the road with an added number of converts.

Where is this leading us to? As a people, what will be the result? There is little need of speculation. No



THE MORE SPECTACULAR TIMBER-LINE LAKES OFTEN SERVE ADMIRABLY AS CLIMAX POINTS ON PACK TRIPS, AS WELL AS OFFERING EXCELLENT OPPORTUNITIES FOR THE ANGLER. THIS IS A BEAUTIFUL SPOT ON SNOWMASS LAKE IN THE HOLY CROSS NATIONAL FOREST IN COLORADO

one can make camp among the tall trunks of spruce or fir or stand on the top of a massive mountain peak without being the better for it. The magnificent mountain land, the lakes of the North, the great sweep of the ocean coast whether bordered by rugged cliffs or sandy beach all have some touch of the Infinite in them that, if he be kindred of Nature whatever, calls to man with an irresistible voice and makes him a better citizen, mentally, physically and spiritually for having lived in their presence even if only for a few hours.

Grant that recreation of this type is a thing good for the Nation; that every year will see a greater mass of people leaving their city environs to play in the woods, mountains, lake-lands and beach-places. Again comes the question: Where is this leading us to? Are we ever going to face a recreation famine?

The idea seems absurd. Some would believe it enters the sphere of the ridiculous. Today the putting of such a question would seem unwarranted. But scoffers not long ago said that our timber supply was inexhaustible. It was said also that our farm land was unlimited. Our coal supply was reckoned adequate for every need for scores of years to come. Today recreation stands in the same position that these other great National resources did some few years ago. It seems unlimited. But there is a limit to the recreational use of our great areas, especially adapted to outdoor play and right now is not too soon to start taking stock so we may have the greatest return from these areas without loss of effort, funds and scenic values.

Decided steps in advancing the organization of the recreation resources of the country have been made in the last four or five years. And these are the more encouraging because the thing that is most needed today in the field of national recreation is organization of planning, administration and development.

First among these is the organization of the National Park Service which has charge of the administration and development of the great areas within the borders of these national scenic centers. Under this head have been gathered together the many units which at present make up the system of National Parks and which before were without any centralized direction. This new Service is still comparatively young but its creation alone is a step forward.



A VACATION LAND WHERE YOU CAN UTTERLY LOSE YOURSELF AND FORGET THE WORLD OF MEN IS FOUND IN THE NATIONAL FORESTS. WITH PACK TRAIN AND GUIDE YOU CAN LOAF ALONG THROUGH FORESTS AND MEADOWS AND VISIT SCORES OF PLACES THAT WILL SATISFY YOUR LONGING FOR THE GREAT, UNSPOILED WILDERNESS. THIS IS A SPOT NEAR OBSERVATION POINT ON WHEELER TRAIL, ON THE RIO GRANDE NATIONAL FOREST IN COLORADO

Of no less importance is the advancement of the recreational use of the forests and it's recognition by the United States Forest Service as a major use. Within the National Forests in such isolated tracts of small size as to not merit a separate administration are many spots of beauty equal to any found in other parts of the country. Besides these spots of exceptional beauty there

are many natural wonders such as caves, curious rocks and unusual waterfalls which are of sufficient interest to be preserved and protected so they may be capital stock of the scenic wealth of the nation. Further, there is but little of the great National Forest System which does not lend itself to recreational use. And the best feature of all in the case of the recreational use of forests is,



THIS UNUSUAL BIT OF WHITE WATER COMES TUMBLING DOWN WITHIN A QUARTER OF A MILE OF THE CABIN AT GREEN RIVER LAKE IN THE BRIDGER NATIONAL FOREST, WYOMING

there is but slight interference with any of the older established economic uses and the gain through the use is almost pure profit.

Here we have the two great capitular recreation resources of the country. In the case of the parks they are devoted to recreation alone. There is at the present time an unfortunate move in some quarters to reap commercial profit from the economic resources found within these great national areas. This move is diametrically opposed to the fundamental idea of the National Park System. These should be kept from the inroads of commerce for there is little question but that the loss in aesthetic qualities, the detriment to the parks, would far overbalance any gain to the nation from commercial exploitation and no individuals should be allowed to injure the parks for private gain at the expense of the public. The parks should be sanctuaries where nature will remain supreme and the only development that is a rational one in these areas is a plan which follows good landscape principles in presenting the beauties of the park and that should be established only after a complete and comprehensive scheme has been carefully worked out by a competent artist.

As opposed to the park idea the recreational use of the National Forests is not paramount but coincident. The economic uses progress without interference on the part of recreation except in unusual cases. Actually this added use to the ones established in the forests helps the older ones in many ways. Roads built for recreation also serve in opening new timbered areas, reaching isolated homesteads in the forests in allowing fire patrol to reach hitherto remote fire hazards and in administration of the forests. The reverse is as true. Roads built for any one of the economic uses serves too for recreation. There will be no interference with economic



GOOD PLANNING OF RECREATIONAL DEVELOPMENT WILL UTILIZE ALL RECREATION VALUES SUCH AS ARE FOUND AROUND THIS LITTLE LAKE IN THE COLORADO NATIONAL FOREST WITHOUT LOSS OF ECONOMIC RESOURCES

uses in the forests on the part of recreation except where greed may attempt to destroy beauty and scenic wealth which is of so much greater aesthetic value than commercial value that the loss would be wholly unwarranted.

But the recreational use of these two great systems follows almost identical fundamental principles. The recreation found in the forest, that is just without the boundary of a park, is of as great value as that found across the imaginary line. But the forests are in the Department of Agriculture and the parks are in the

Department of the Interior. The simplest manner of bringing these two services under one executive head would seem to be to place them both in the same department. But at present they stand in separate organizations. With all of the good will possible under the circumstances, with all of the desire to co-operate that may be present, the functioning of the recreational work of these two departments cannot be as well correlated as though there were some central policy-making body of single executive group that could organize the recreation of the nation without regard to map lines, with no consideration of imaginary boundaries and which would think primarily of returning the greatest aggregate recreational wealth to the nation and the world that is possible from our magnificent areas in the National Parks, Forests, Monuments and Reservations.



A LAKESIDE CAMP UNDER PERMIT IN THE PIKE NATIONAL FOREST IN COLORADO. A REALLY SUBSTANTIAL CABIN, WITH A BRICK FIREPLACE, ASSURES COMFORTABLE HOUSEKEEPING AND ONE CAN LOOK FORWARD TO LONG DAYS OF PLEASURE AND NIGHTS OF INVIGORATING REST IN ONE OF THE MOST BEAUTIFUL OF THE NATIONAL FORESTS

Would it not then be a further step forward if there were to be formed such a body with any power that seems fit to organize this recreation resource of the nation? There are a number of organizations of national scope that would lend their support to any such move. The best talent in the land could thus be brought into consultation on the problems facing the recreation organization insuring the best possible development. And this group could continue to function as an advisory body in the event the two services were at some time placed in the same department.

Foremost of all, the professional landscape architects of the country have a deep interest in the development of our national recreation grounds. Fundamentally the art practiced by this group has to do with the fitting of earth surfaces to human use, the magnitude of their problems extending from the most compact of home grounds to the organic plan of whole cities, park systems and the organization of a schematic development of entire regions. There is no question but that the American Society of Landscape Architects, the official organization of the profession, would lend all aid that is necessary to put the planning and development of our national recreation system on a sound basis.

The foresters as represented in the Society of American Foresters and the American Forestry Association could give inestimable assistance to the forming of a recreation policy and system which is to grow up in the areas which will in most cases be found to have forest cover. There is little question but that the most enthusiastic kind of support of a plan for general organization of recreation would come from members of this profession.

Engineers are needed to aid in those problems which are primarily based on engineering. Roads are to be built, sanitary systems are needed at many points to safeguard health and many technical engineering problems will be present. Engineers wherever they may be are ever progressive and their support as represented in the many national socities may be counted on.

The architecture which will be found within these areas serving the public is as much in need of the skill and artistry of the architect as the forests of the forestman or ground surfaces and covers need intelligent planning by landscape architects. By all means there should be architects in such a group as may be formed and the National Society should be counted on for the same strong support as the other professions.

In those professions named are found the principal ones which have to do with the planning and development of the areas which are adapted to recreation. There is another group that should have ample representation. They are the commercial men, who, after a scheme is worked out by competent artists and engineers, take hold of the running of the organization which is to make the plan function.

The executive phase of this work should be represented by men that have had experience in the work. Hotel men, transportation men, advertising men and those pioneer spirits who have been in charge of the first "tourist bureaus" of the country should be heard in this national recreation organization.

One is as necessary as the other of these two groups. If the professional men would not turn out a good working plan there would be little use of the commercial group taking charge of it. And if there were not the men to take over the organization and running of a scheme so that it would properly function there would be little use of making a scheme.

The discussion of the organization of our recreational resources could go on and take up the developments which some states have been able to accomplish in their parks and forests. This system within the states, secondary in magnitude only to the great areas of the nation and equal or surpassing them in use is as potent a factor in national life as those great systems mentioned earlier. And more than ever is there needed here some guiding light for the men who are trying in the several commonwealths to organize the best recreational territory there is in the state for the use of their citizens. A national commission would serve as an inspiration and model for the state organizations and the good council of the national advisory body could be extended to aid the states.

Of equal importance although of lesser size are the county parks. So far the county system has been established in but few localities but where such has been the case the development has justified its existence. This group of public grounds rounds out what might be termed the national recreation system.

Today what is needed most is good sound judgment and true artistry in planning and an organization which will back up that judgment and artistry so that it becomes living facts. The general recreational use of the great outdoors is upon us and the first wave has but touched the great areas of nation, state and county. Far in the future may come a time when there will be no place which will offer the type of recreation we can now offer in our national system. Are we then truly facing a future famine in recreation? The answer lies in what happens in this field within the next decade. With



GOOD ROADS AND A UNIFIED TRAFFIC SYSTEM ARE NEEDED IN ANY RECREATION SCHEME. ROADS BUILT FOR RECREATION ALSO SERVE IN OPENING NEW TIMBERED AREAS, REACHING ISOLATED HOMESTEADS IN THE FORESTS AND ALLOWING FIRE PATROLS READY ACCESS TO REACH REMOTE SPOTS QUICKLY AND EASILY. THIS ROAD OVER COCHETOPA PASS IN COLORADO IS A GOOD EXAMPLE



MANY DELIGHTFUL TRIPS MAY BE TAKEN BY MOTOR BOAT—TO THE INDIAN CAMPS ALONG THE BANKS DURING THE BERRY SEASON, TO BEACHES WHICH LURE ONE TO TAKE A DIP IN THE CLEAR WATERS OF THE LAKE, OR TO FISHING GROUNDS THAT HOLD FIGHTING GAME FISH OF LARGE SIZE, ADDING ZEST TO THE LIFE OF THE SPORTSMAN

proper planning and far-sighted policies established we will be able to meet the oncoming years without any chance of not satisfying our demands for recreation. Only through unorganized conditions and ill founded plans can we lose our great heritage in the scenic wealth of our land. But this wealth is so easily dissipated through what is often believed to be and mis-named development that the time may easily come when there will be no last wilderness where one may go to view God's handiwork without the chance of viewing also a hideous structure or the marring of scenic beauty by the grossest commercialism.

Now is the time for the beginning of an amply organized, properly planned, well executed system of national recreation. Today we are but partly organized. There is a lack of correlation of all agencies working toward the development of this resource. There is a lamentable lack of competent artistry in these developments.

Never again will there be the opportunity to start with so few mistakes made as at present. The great untouched wealth of many areas but remains to be planned and developed to offer recreation, health and joy to thousands. The movement to the outdoors has no more than started and ten years hence will see all forces scrambling frantically to stay ahead of the tide unless count of the future is taken today.

Are we facing a new kind of a famine—that of available recreation? Yes and no. Yes! If we do not now start to fully organize and adequately plan for the future developments and now systematize our present efforts. No! If we can start now to look far into the future when the population of our country has perhaps doubled and people demand governmentally owned open spaces where they may go each year to live their vacation time. No! If we can but see the vision and now start a really comprehensive plan for each unit within the national system and as well an ordered plan for the whole.

Many men of great vision and ability stand ready to help in any plan for the betterment of our recreation system. Today we have unexcelled material for such a system based on the great National Forests, Parks, Monuments and Reservations. State and county parks are being developed in widely separated regions heralding a day when they will be universal. The future promises a use of these areas that today can be but conjectured. Are we going to make the most of this opportunity and meet the coming demand? Will our recreation areas meet the exacting requirements in the future or will people longing for outdoor life have to continue to live hungering? Correlation, organization, well founded and artistic planning and vision can solve the problem and the foundation stands today waiting for master builders to rear thereon a structure of splendid proportions which will give our land for all time a truly national recreational system. Proper action now assures the future of such a system that will be more than even in the coming years a national asset of inestimable value.

THE USES OF WOOD

WOOD'S PLACE IN THE HONEY INDUSTRY

BY HU MAXWELL

THE forest holds a place of twofold importance in the honey industry. First, the bloom of trees constitutes a valuable pasture whence bees collect honey; and, second, the wood derived from the forest supplies most of the material of which hives, frames, stands, boxes, houses, and other appurtenances, are made. This holds true of few other industries, for it is unusual that a tree supplies a product and also supplies the receptacle in which the product is placed for storage or for shipment. It is proper that wood be given due credit for the contribution it makes in both of these lines.

Scientists have made a closer study within the bee hive than in the home of any other creature of animated nature, for the reason that the habitation is a combination of the home and the workshop. The inhabitant lives in it and works there, and those who wish to investigate the labors and social habits of these industrious workers must peep inside the hive and there glimpse the remarkable activities of these wonderful insects which have amused, instructed, astonished, and fed some of the wisest of the human race. No other creature works so hard and so persistently for man, and few others so well repay care and good treatment. But it is not the purpose here to praise the bee or to dilate on its remarkable worth as a teacher and a worker; rather it is the purpose to speak of the uses of wood in providing for the wants of the bee and at the same time for the wants of man. Doubtless the earliest wild man that made the discovery that honey was good to eat was well stung for his pains, but the vicious sting of the bee never afforded complete protection against robbers, though it is generally ample protection. So tempting is the sweetness, that a painful sting is necessary to safeguard it from all manner of marauders.



BLACK CHERRY

These dainty sprays of sweet bloom are special favorites of the bees.



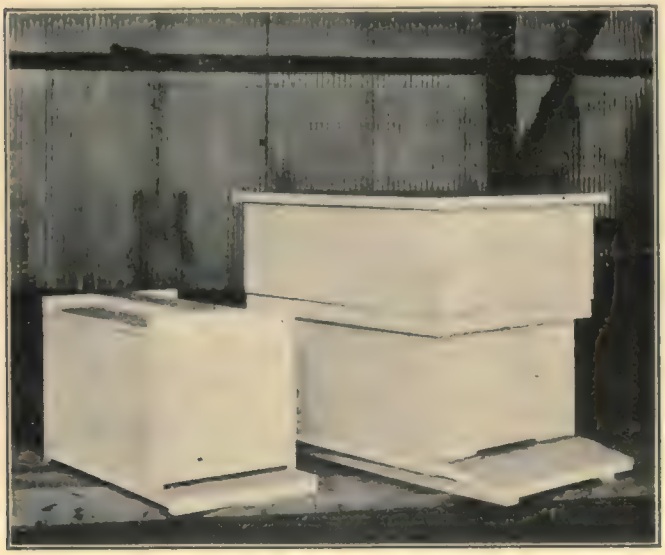
THE BEEGUM OF THE PIONEERS

This is a section of a hollow cottonwood log in which bees are storing honey on a Kansas farm. It is a relic of former days and is fortunately going out of use. *(Photograph by Frank C. Pellett, Hamilton, Illinois.)*

It is believed that the earliest food store laid aside for his wants by man, and which is still in existence, is a jar of honey found in an Egyptian tomb, and probably placed there for the sustenance of the dead during the journey across the Stygian River. When found, the honey had changed into a very dry candy and it had lost its sweetness, though it could still be identified as honey. As a side issue it may be stated that in the bottom of the jar, well covered with honey, was a dead flea of precisely the same sort as those which plague Egypt to this day. Apparently, the insect had hopped into the jar while the last rites over the dead were being observed, and when the jar was corked, the little fellow was shut up within, and, like the true patriot, he probably could have declared that death was sweet. Anyway, he sank to the bottom while the honey was still soft, and there the archæologists found him after a good many thousands of years.

Bees are naturally wild, and have been tamed by man who has provided homes for them in exchange for the food which they furnish him. If he relaxes his care and attention, they speedily relapse into a wild state, and often they elude him and fly away in a swarm, and to all intents and purposes they are as wild as their ances-

tors were before they first made the acquaintance of men. A swarm bred and reared in the highest civilization, will escape and take up its abode in a hollow tree or in a hole under a rock, or in a crevice in the face of a cliff, and there the bees set to work to store honey for



UP-TO-DATE BEEHIVES

This shows the latest and most approved home for bees where safety and comfort are provided for the industrious workers. Extremes in hive construction, the large Dadant hive and the small Langstroth hive, show comparative sizes. (*Photograph by Frank C. Pellett, Hamilton, Illinois.*)

their own wants, and they appear not to miss the care and attention of men. In a forest, wild bees nearly always find hollow trees for homes and as storage places for honey, but in some regions, they use holes in the ground. Man makes shelters, hives, and other appliances of wood when he provides for his bees. For these purposes nothing is better than wood. It has all the good qualities and few of the bad. The more highly the bee business is developed, the greater the use of wood and the more carefully the wood is prepared for the various places in the industry which it is expected to serve.

It was formerly customary in this country to provide hollow logs for hives, which were called gums. The logs were crosscut into lengths of two or three feet, and the receptacles thus provided were stood on end in some out-of-the-way place, and a board was nailed on the top of each gum for a roof, and it was ready for the home coming of the swarm of bees which was to make a domicile of it. Frequently the hive stood out of doors with no covering other than the board on the top. The gum contained no partition, no loft, no basement. The bees stored their honey in it, fastening the comb to the dirty walls, and there they worked in the dark during the whole season, provided they were not eaten out of house and home by moths, mice, and other enemies. All the ventilation they got was what they provided with their own wings, fanning the air in by efficient team work, arranging themselves in long rows for the purpose and working their wings for fans.

When the owner came round in the fall of the year for his share, after the work of the bees for the season was over, he pried the board from the top of the hive, scooped out a few pails of honey, guessed at the quantity he was leaving for the swarm during the coming winter, and nailed the lid on again. If the bees did not starve or freeze during the winter, they began in early spring to fill the old gum again, preparing another haul for their inconsiderate owner.

Bees do not hibernate, as most insects do, and they must have food and warmth during the winter, or they will perish. They provide food enough, if permitted to retain a fair portion, and their bodies furnish sufficient heat, if the hive is protected in a measure against extreme cold.

The world has seen many strange sorts of bee hives. A lion's dry skeleton answered that purpose, as is inferred from the famous riddle propounded by Samson to his enemies. Pictures in old almanacs represent hives built of straw rope, wound round and round, narrowing to the top, and shaped like Eskimo huts. Such hives belonged in Europe where some of the people called them "bee baskets;" but they never had much of a foothold in America, where nearly everybody used wood in some form. During early times in the southern



A BEEHIVE IN SOUTHERN TEXAS

The bees took possession of a common box with one side wholly open and proceeded to store their honey in it. This is a freak hive and is not common, but it shows that the little workers are easily satisfied. (*Photograph by Frank C. Pellett, Hamilton, Illinois.*)

states hollow cypress knees served as bee hives on some of the plantations where negroes had charge of the bees and saw to it that the honey was periodically collected and made use of. Similar cypress knee hives were in use in southern Illinois in 1820, as is learned from the book of an Englishman who traveled in America during that year. The cypress knee is a peculiar growth or excrescence rising from the roots of the tree where the ground is covered with water most of the time. The knees are slender, hollow cones six inches or more in diameter at the base and tapering to a point. The largest may have capacities of six or eight gallons, or even more, and bees accepted them as domiciles, if placed within reach. They were rather poor excuses and were less convenient even than hollow logs which were often used side by side with the knee hives. As the hollow log gums and the cypress knees went out of use they were succeeded by a bee hive made of boards nailed together to form a box, which was a little better than the hollow log; at least, it looked better. The next improvement consisted of a little box set on top of the large one. The top box was called a "cap." The bees filled it with honey after the hive was full—sometimes before. The owner took the honey in the cap, as his portion, and left the swarm in possession of that in the main hive. A vigorous swarm in the climate of the northern states wants thirty pounds or more of honey as the winter supply, but a little less will do in the South where the winters are shorter. When the owner took one cap he set another in its place, if he believed that the swarm could fill another before the close of the season, and thus he doubled his share.



TRANSPORTATION PROBLEM SOLVED

Loading hives of bees at the Dadant apiaries near Hamilton, Illinois, for a thirty mile haul. Five hundred colonies were hauled on trucks and in 1919 they produced twenty tons of honey. Everything is up-to-date. (*Photograph by Frank C. Pellett, Hamilton, Illinois.*)



BEE BUSINESS WELL CONDUCTED

This is a Kansas scene and shows how bees are cared for by the owner who takes pains to provide for the safety and comfort of his bee workers. Hives are made of high class wood. (*Photograph by Frank C. Pellett, Hamilton, Illinois.*

Bee keepers now do much better than formerly for their faithful workers. Decent hives are provided for the swarms, and the larger amount and better grade of honey received pays well for the attention bestowed on the workers. Frames which are sometimes called honey boxes, are made for the comb, each frame four or five inches square. One fits beside another in such a way that when one set of frames has been filled with honey, they can be lifted out and empty frames can be inserted in their places without disturbing the others. This arrangement is advantageous in more ways than one. The clean, fine squares of honeycomb may each be handled

separately without the loss and waste that was inevitable when the honey was cut and torn out of the old style hives.

Machines have been invented and put to use by which the liquid or rendered honey can be removed from the comb without breaking it, and when thus emptied the frame and the comb may be replaced in the hive ready to be filled again, and thus the same comb may be used two or more times. The bees are thus spared the labor of making new comb and can devote their whole energies to honey making. It is believed that the manufacture of comb involves as much work on the part of bees as the gathering of the honey that fills it, and the use of the same receptacle a second time is economical. Comb manufactured of aluminum has been found practicable and manufacturers of bee supplies advertise it, but the use of aluminum comb promises neither to increase nor diminish the use of wood in the honey business.



THE WILD CRAB

Blossoms most beautiful and fragrant, and in May time, when the flowers are at their best, they attract the bees by the hundreds.

The small frame in which the bees build their comb requires little wood. Perhaps a cubic inch suffices for a frame, for the stock is quite thin and the strips are little more than an inch wide; yet, in the aggregate, a rather respectable bill of lumber is required to supply bee keepers with honey frames for a single year. A wood of white color and light weight is wanted, and basswood is one of the best, but pine, yellow poplar, spruce, and cottonwood are in demand, particularly that species of cottonwood known as balm of gilead. The number of woods suitable for hives is larger than are those suitable for honey frames. White pine is a favorite wood for hives, but many others are in use, both softwoods and hardwoods.

Bees make full use of the forests. No class of workers derives greater benefit from the trees and their products. To begin with, the hive and most of the apparatus of the honey business is of wood. Bees live in wooden homes in most instances, and have always done so, whether those homes have been hollow trees or hives made of lumber. They resort to the bloom of plants for honey and for the wax with which they build their comb, and also for the special food which plays so vital a part in the hive economy. Bees collect a little honey from sources other than flowers, but not much; and what they take from other insects, mostly originates in flowers, even if the bees do not take it firsthand from the bloom.



THE INDUSTRIOUS BEE KNOWS THIS FLOWER WELL

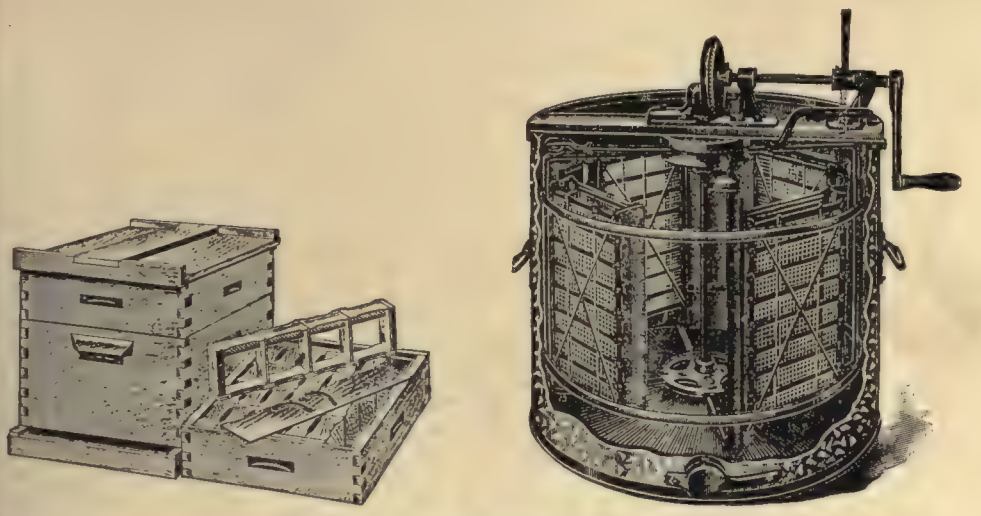
Wild cherry bloom, and the bloom of tame cherry, too, for that matter, may be listed with the most reliable pasture for bees, provided the supply of trees is not too small. The tree blooms profusely and at a time when bees are very anxious for the harvest.

Bee raisers who engage intelligently in their business must be well acquainted with the principal sources of honey, but the honey resources are not the same in all regions, nor is the honey made in one district always of the same quality as that made in another district. It depends on the sources of the honey. Persons accustomed to the honey of the Allegheny Mountain region often express disappointment when they taste that produced in the prairie country where a wholly different kind of pasture supplies the bees. The tree bloom of the mountains imparts a richness and flavor to the honey made there that is not recognized in some regions where the bees have resorted to other sources. Most flowers furnish something to the bee, and no small part of the annual crop of honey comes from plants which live but a single year, or which, at least, spring up each year from the roots. But the industrious insects work the same trees year after year. Of course, the same bee never works the same tree or plant the second year, for the working



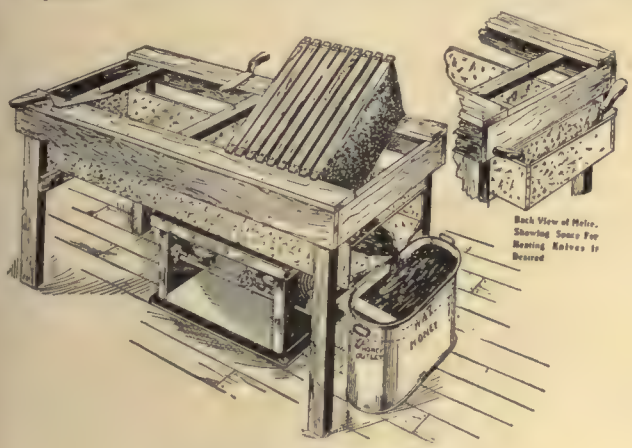
THE WILD PLUM

The bees love the beautiful white blossom sprays of the wild plum.



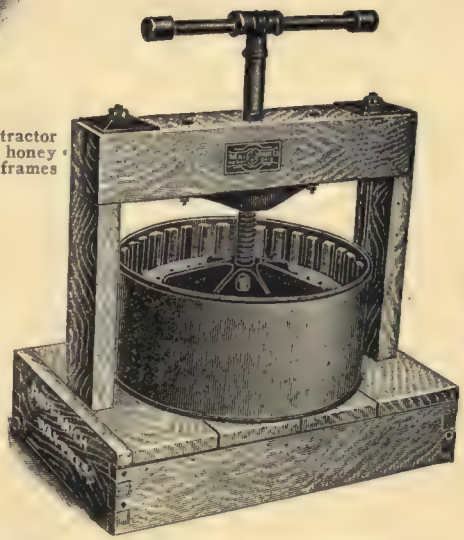
APPLIANCES FOR HANDLING HONEY

This illustration shows a modern beehive ready for the reception of bees, and beside it is an extractor for removing honey without breaking the comb. By revolving the honey frames rapidly, the honey is thrown out by centrifugal force. The frames are of wood, and so is the hive in which the frames are placed.



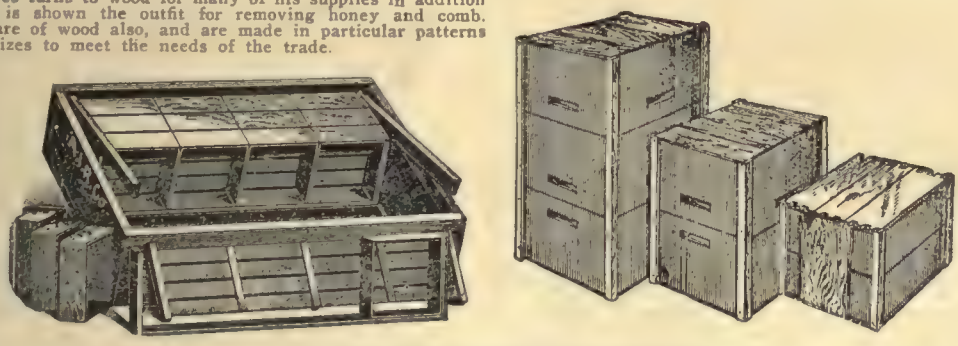
SUPPLIES FOR BEE-KEEPERS

The keeper of bees turns to wood for many of his supplies in addition to hives. Here is shown the outfit for removing honey and comb. Shipping boxes are of wood also, and are made in particular patterns and in special sizes to meet the needs of the trade.



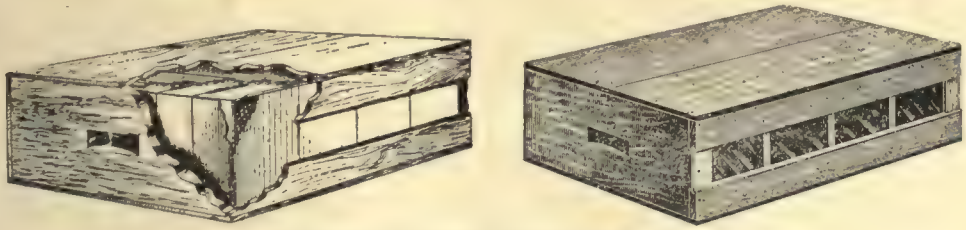
EXTRACTING HONEY AND PRESSING WAX

Here is shown the bee keeper's arrangement for extracting honey. The regulation press for reducing the comb to solid cakes of wax. Profit in bee-keeping depends upon saving the wax as well as the honey. Both are in large demand.



PACKING BEE SUPPLIES FOR SHIPPING

Not only are bee hives and other supplies made of wood, but the packing and boxing for shipment are likewise done with wood. Wooden crating is more convenient, more dependable, and less expensive than crating of any other kind, and wood is nearly always used when shipments are made.

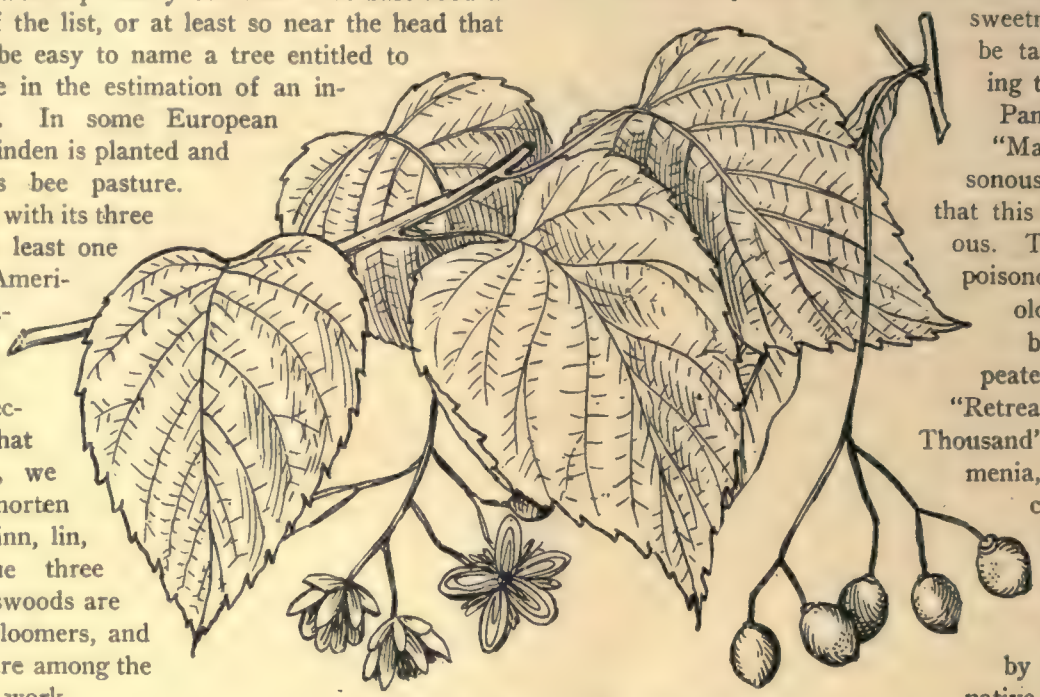


PROTECTING HONEY DURING SHIPMENT

The insinuating ant lies in wait at all advantageous points ready to make raids on shipments of honey, and as a precaution against that danger the cases in which the honey frames are packed are made insect proof by matching and joining the lumber of which the packing cases are made. The protection thus afforded is ample.

bee's life usually does not extend into the second year. Without forest flowers bees would often fail absolutely in their work, and could not lay up enough for the following winter.

Apiarists make charts of "bee pastures," meaning thereby the area and flora which supply the workers. Few hardwoods fail to contribute a generous share to the hive's store, for most hardwoods are rich in bloom and the bloom is rich in honey; but some are worth more than others as bee pasture. The more abundant the hardwoods in a region, the better honey district it is likely to be. The task of picking out the best honey trees would be difficult, because several have claims well supported by evidence; yet if all things are taken into consideration, it would probably be found that basswood is at the head of the list, or at least so near the head that it would not be easy to name a tree entitled to a higher place in the estimation of an industrious bee. In some European countries the linden is planted and maintained as bee pasture. Our basswood with its three species and at least one variety is the American representative of the European linden, and in recognition of that relationship, we sometimes shorten the name to linn, lin, or lyn. The three American basswoods are all luxuriant bloomers, and their flowers are among the few that are workable by bees in wet weather as well as in dry. The peculiar arrangement of the leaves on this tree produces a sort of thatch by the overlapping of the edges, and this thatch shelters the bloom and keeps it dry during showers which dampen all else. If a bee is overtaken by a sudden rain and can fly under the umbrellalike shelter of basswood foliage, it is safe from the rain. After the shower has passed, and while all other leaves and bloom are wet, the bee can work the dry bloom of the basswood, thus losing little time and finding new opportunity. It is not certain just how this peculiar leaf canopy is taken advantage of by bees in rainy weather, but there is reason to believe that the situation is well understood by them.



BASSWOOD BLOOM FOR HONEY GATHERERS

Perhaps no other blooming vegetable genus in the world furnishes bees with so much honey as basswood, which is known in Europe as linden, and in some parts of America as lin. The tree grows in nearly all parts of the eastern half of the United States, and it is frequently found in great profusion.

Among some of the hardwood regions, bee keepers claim to be able to pick out from a full hive the combs which are filled with basswood honey. They judge by the color and also by the taste. In their parlance it is known as "poplar honey." Basswood has an undisputed place in importance among wild trees as a source of honey, but it is only one of several good sources which bees are able to make use of among the trees of the forest. Yellow poplar is visited quite eagerly by bees, but this species blooms less luxuriantly than basswood. Sourwood, which is known also as sorrel tree, sour gum, or lily of the valley, is not abundant in the forests, but wherever a tree is found in bloom, there will bees be found also, busy with the small, bell-shaped flowers. The tree is found in most of the country east of the Mississippi River, except in the extreme northern part. All four of the sumacs, including the poisonous species, furnish loads of honey for bees. All of the locusts are rich in nectar, and during their brief periods of bloom, the buzz of bees may be heard about the showy flowers. The flowers of yellow or black locust are so filled with sweetness that it may be tasted by chewing the bloom; but Pammel, in his "Manual of Poisonous Plants," says that this honey is poious. The subject of poisonous honey is an old story and has been often repeated. During the "Retreat of the Ten Thousand" through Armenia, as the account is given in Xenophon's "Anabasis," the soldiers were poisoned by partaking of native honey which had been made by bees pasturing on a laurel which grows in that country. Centuries after that time the Romans, remembering the experiences of the Greek army under Xenophon, refused to receive the honey from Armenia, fearing poison. The flowers of our kalmia laurel and also of the rhododendron, are reputed to yield poisonous honey; but since bees collect it and store it, and as no well authenticated case seems to be known where persons have been poisoned by eating laurel honey, it would appear that the honey cannot be very dangerous.

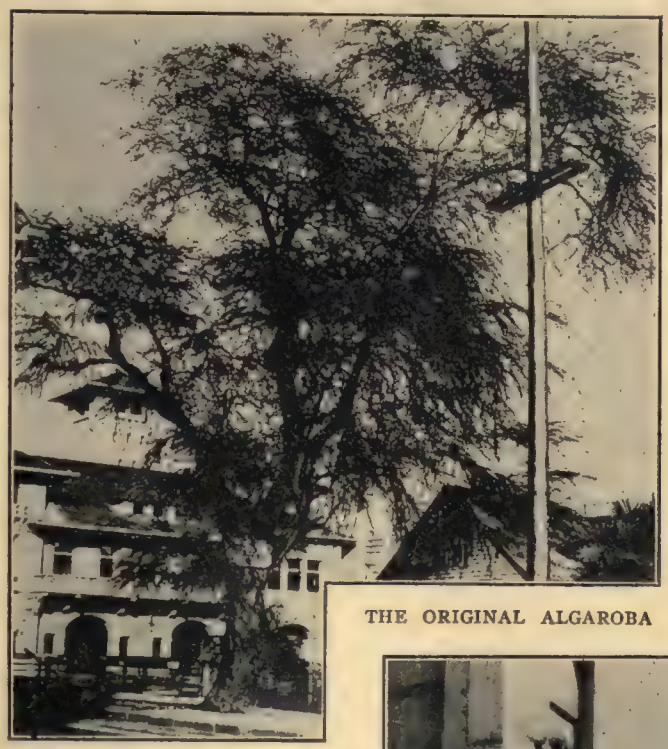
Among the other trees considered valuable as producers of honey in this country are holly, judas tree, the maples, black gum, chestnut, willow, service, and fruit trees of most varieties, but particularly apple, peach, plum, and cherry.

It is well known that too much honey is not good for the health and that a diet of honey is apt to cloy in a short time. The claim is made, however, that if it is eaten in connection with milk, that is, a mixed diet of milk and honey, the undesirable effects are not noticed.

THE FIRST ALGAROBA TREE IN HAWAII

BY C. S. JUDD, SUPERINTENDENT OF FORESTRY

NO introduced tree has been of greater benefit to the Hawaiian Islands than the algaroba (*Prosopis juliflora,* D. C.), one of the mesquites, or kiawe, as it is locally called. It is also known as the honey locust, honey pod, cashaw, and July flower, and our name for the tree of algaroba comes from "Al-kharrubah," the Spanish name of the carob tree, or St. John's bread, the pods of which it resembles in flavor. The native home of the algaroba is from California to Texas and through parts of Mexico, Central and South America, as far south as Buenos Ayres.



THE ORIGINAL ALGAROBA

While the history of its introduction to Hawaii is not definite, the conclusion seems to be that the first tree planted in the islands was raised from seed brought by Father Bachelot when he started out from Bordeaux in the early part of 1827 on his first trip to the Islands, and that the seed came from the Jardin du Roi de Paris and not from Mexico or Chile. This original tree was planted by Father Bachelot in December, 1828, in the north corner of the Catholic Church yard in Honolulu. Certainly, no man could have left a greater or more abiding monument, for the algaroba now covers vast areas on the different islands of mostly stony, arid, and precipitous land, which formerly was utterly worthless for other purposes.

The original tree is still growing on Fort Street, near Beretania Street, and although it was severely topped in 1906, to make room for the Fred Harrison block, it has today a diameter at breast height of 3 feet 3 inches, and is still good for a great many years. The accompanying illustration shows the tree when it was in its full splendor about twelve years ago.



AND ALL THAT IS LEFT OF IT

The value of the algaroba in Hawaii has been enhanced by the ease with which it can be propagated and its ability to grow in arid regions. The tree belongs to the leguminous family, and begins to bear pods when six years old and even younger. These are eaten by stock, but the small, horny seeds are not crushed while passing through the alimentary system but rather are prepared for quick germination by the action of the digestive fluids. The spread of the tree in these islands has, therefore, been due solely to stock and by this means the algaroba has become a wild forest tree. It is estimated that it would have cost at least one million dollars to plant by human agency the 80,000 odd acres in these islands which have been covered with more or less density by algaroba forests. And this wonderful and comparatively rapid spread of the tree has been accomplished without the expenditure of one cent for planting.

The algaroba in Hawaii seems to excell in growth the tree in its original habitat. In Arizona, trees 75 years old are from 10 to 12 inches in diameter, and near Tucson trees measure 3 feet in diameter at the ground and 50 feet in height. On the Punahou grounds a tree not yet 70 years old measures 41 inches in diameter at breast height and 85 feet in height, while trees on the Dillingham place, which are 50 years old, average over 2 feet in diameter. The tree in these islands is a comparatively rapid grower, and takes hold of waste land in a surprising manner. It has few natural enemies; the caterpillars of two introduced and very common moths affect the bloom and occasionally reduce the size of the bean crop, and the grubs or four beetles bore into the sapwood of dead or felled trees.

The uses of the tree, in addition to being a forest cover for waste land, are too well known to need much elaboration here. The following, however, are some of the

main products of the algaroba and the chief uses to which it is put in Hawaii.

Wood for fuel, charcoal, timbers, and posts.

Pods for fodder in their natural state and crushed into meal.

Blossoms for bee pasturage.

Trees for reclamation of waste land, ornament, and shade.

Young trees for hedges.

The wood of the algaroba is a dark reddish brown in the heart, is as heavy as and harder than ash, elm, or white oak, but not so strong or elastic. For fuel it is equal, cord to cord, to hickory or white oak. Its durability is highly in its favor, and the heartwood used as fence and foundation posts will last in the ground for a great many years. The sapwood is a clear yellow and is apt to be riddled by borers if not used soon after cutting. The smaller wood makes excellent charcoal, while in Honolulu the best quality of fuel wood sells for $14 per cord in enormous quantities annually.

The honey industry in Hawaii is dependent almost entirely on algaroba blossoms, and the clear honey product is most delicious. The exports of honey and beeswax from the islands in 1915 were worth $49,169. The value of waste land has increased manifold on account of the algaroba, and what would Honolulu be without the algaroba as a shade tree? The young plants, set thickly together, have been successfully grown as hedges which are quite protective on account of their thorns.

A boon to stockmen, the standby of the apiarist, and the chief support of the wood dealer, the algaroba has well earned its place as the most valuable tree in Hawaii today.

THE CHESTNUT BLIGHT IN THE SOUTHERN APPALACHIANS

BY G. F. GRAVATT

IN 1904 the chestnut blight, a fungus importation from Japan and China, was recognized as a serious disease around New York City. Since then the disease has spread steadily from New York as a general center, rapidly killing the chestnut trees.

The chestnut growth of northern Virginia and of the three northeastern counties of West Virginia in 1915 had numerous spot infections of the bark disease but it was not generally infected. A brief inspection trip in the fall of 1919 showed that the chestnut growth from Nelson County in central Virginia northward to Washington, D. C., and westward to a line running through Albemarle, Green, Rappahannock, Frederick and Hampshire Counties, had an average of 5 to 15 per cent of the trees killed by the disease and 90 per cent of them infected. The infected trees will die in a few years. This is a general average for the above section as some tracts of chestnut timber have a large per cent of the trees infected and dead, and other tracts a much smaller. The most southern natural infections known are in Virginia in Patrick and Henry Counties, which border on North Carolina. Undoubtedly the disease extends considerably further south and west; as only a brief inspection was made, the limit of extent was not determined.

The zone which is heavily infected with the bark disease, has been spreading southward from New York at an average rate of over twenty miles per year. The disease has been spreading westward across the mountain ridges somewhat more slowly. In the spread of this disease in the past, infected nursery trees were quite a factor, being much more important than they will be in the future. However individual cankers enlarge at a much faster rate in the south than in the north. There has been hope that the progress of the disease would be retarded by the higher per cent of tannin in the bark and wood of the chestnut of the south or by some other factor. No indications of any decrease in the virulence of the disease have been noted so far and the expectation is that the chestnut growth of the Southern Appalachians will be killed off just as the growth from New York south to southern Virginia is being killed.

In the Southern Appalachians it is expected that the loss to private owners through deterioration of killed chestnut timber before it can be marketed will amount to a very large sum. Local markets become glutted and local sawmill men become swamped with work as the practically impossible task of cutting over the entire forest area of a large region must be accomplished within a comparatively few years in order to prevent serious deterioration. Dead timber is more difficult to cut and saw than live timber, in addition to the greater breakage in felling and the difficulty in selling. Chestnut of pole and timber size can, of course, be utilized for tannin acid extract wood after deterioration makes it unfit for other purposes. Owners of tannin extract chestnut who do not cut their trees within a few years after they are killed should figure on a decrease in volume of wood due chiefly to fungus decay. It is a pity that so many of the individual owners of woodland do not consider their forest growth as a crop, as a business to which attention must be given if profits are to be secured. Already in northern Virginia thousands of acres of chestnut growth need to be cut quickly if deterioration is to be forestalled, especially in the case of trees suitable for poles. Many owners make no effort to market their dying chestnut, not realizing that it is decreasing in value. In many cases where chestnut does not constitute a large per cent of the stand, it suits the owners better to allow the chestnut to deteriorate while waiting for the time when the entire stand can be cut over, or waiting for other reasons.

It is important though for owners to realize present conditions in regard to their chestnut growth and make their plans accordingly.

On a brief inspection trip in North Carolina in July, 1920, advance infections of the chestnut blight were found in the following counties: Stokes, Surry, Yadkin, Wilkes, Ashe, Watauga, and Avery. The disease is rapidly spreading southward along the Blue Ridge Mountains. An infection in Linville Gap, North Carolina, is at an altitude of 4,000 feet. The blight is probably now present in Tennessee, as it has been found in three counties in North Carolina, which border on Tennessee.

SENATOR HARDING ON FORESTRY

EXTRACT FROM ADDRESS TO EDITORS BY SENATOR HARDING, REPUBLICAN NOMINEE FOR PRESIDENT, AT MARION, OHIO, AUGUST 13, 1920:

"PERMANENT and ample relief must come by going to the underlying causes. No forest consumption like ours can go on indefinitely without imperilling our pulpwood supply. Competent authority tells us that the pulpwood in New York State will be exhausted in ten years; that New England will be denuded of its supply in twenty years. Our needs are so vast that we imported nearly one and a half million tons of pulpwood from Canada in 1918, and the Canadian price advanced from ten to twenty-five dollars per cord. It is obvious that we must have a forest policy which shall make us self-reliant once more. We ought to be looking ahead to produce our timber for our pulpwood needs and also our timber for our lumber needs. Forest conservation is a necessary accomplishment to printing expansion, and a matter of common concern to all the people.

"Three-fifths of the original timber in this country is gone, and there are eighty million idle acres in which we ought to be growing forests for the future. Planning for the future, with added protection of our present forests from fire is a matter of deep concern to publishers in particular, but all of constructive America as well."

Extract from Senator Harding's speech to lumbermen at Marion, Ohio, August 18:

"The realization of our highest hopes lies in the continental construction and improved character of our homes," Senator Harding continued, "because they have the first influence in the standard of American living. Quite apart from furnishings and the almost limitless numbers of varied utilities, lumber is the first requirement of the prospective home builder.

"At the present time there is a notable halting in the construction of homes because of the almost prohibitive cost. Lumber plays its very conspicuous part therein. Much of this, of course, relates to the increased cost of production, which dates from the changed conditions since our entrance into the World War, but there is a permanent inclination to advance the cost because of the very manifest diminution of supply.

"We ought to have a national policy of preservation and reforestation. No one disputes that lumber prices are in large part responsible for the halting in the housing building movement. Lumber prices have increased very sharply since the war and prices in many instances have gone up 300 per cent above those of the pre-war period.

"The one thing which the government may do is to adopt that policy which will assure to future generations the timber which is necessary to our lumber needs. There remains a large supply on the Pacific Coast, but the problem of transportation makes this supply unavailable to the East and Middle West, unless we contemplate a cost of transportation which will continue to discourage building enterprise.

"It is a common knowledge that there is ample land in this country of ours, not adapted to other uses, to produce a sufficient supply of timber for all our needs if it is only stocked with trees and nature is allowed to contribute toward our necessities. We must begin to think of timber crops as we do other cultivation in this land of ours, and we must put an end to that carelessness and neglect to which we trace our destructive forest fires.

"With timber growing on the one hand, and forest preservation and protection on the other hand, there isn't any reason why the United States should not be self-reliant in the great essential of lumber for construction purposes."

AUTUMNAL WOODS

When summer voices cease amidst the trees
And all is hushed except a whisp'ring breeze,
The Woods of Autumn don, anear and far,
A gorgeous raiment and regalia.

In silent splendor, 'neath unclouded skies,
Each woodland like a vivid painting lies
Resplendent in the sun, each hillside seems
Like visions we behold in realm of dreams.

In russet and in gold! Half-fresh, half-sear,
Fall's foliage is shining far and near,
Yet here and there some pine trees, ever green,
Subdue the splendor of a sylvan scene.

Autumnal Woods! Which fade ere Frost's fine pen
Draws frozen frets on window-panes again.

—Charles Nevers Holmes.

"HALL OF FAME" FOR TREES



This sycamore, which was only a sapling during the War of 1812, has been nominated for a place in the Hall of Fame by Mrs. John Locke, of Tiffin, Ohio. The sapling stood just inside Fort Ball and it has been marked by the Dolly Todd Madison Chapter of the Daughters of the American Revolution. Mrs. C. H. Van Tine's home now stands beside the tree. Just opposite the sycamore is the site of the home of General W. H. Gibson, widely known as a soldier and orator. Quite near is the monument erected to the soldiers and sailors of the War of 1812 and the Civil War.



Marking a treaty of peace with Indians long ago this tree has been nominated for a place in the Hall of Fame by C. A. Ingraham, of Cambridge, New York. It is the Witenagemot Oak, in the town of Schaghticoke, Rensselaer County, New York.



This tree at Marshall, Michigan, has been nominated for a place in the Hall of Fame for trees because it saw the birth of the school system of the State of Michigan. The nomination is made by Mrs. James Metcalf Redfield, of La Jolla, California.

"HALL OF FAME" FOR TREES



Because a tract of forty acres was set aside by A. E. Wiltse, a mining man of New York City, that this tree might be saved, it has been nominated for a place in the Hall of Fame of the American Forestry Association by J. R. Prince, of Tuolumne, California.



The first flag ever thrown to the breeze in the South, on which was printed "Immediate Separate State Action" was girded to this Red Oak, writes W. D. Craig, of Chesterfield, South Carolina, in nominating this tree for a place in the Hall of Fame of the American Forestry Association. The flag stayed there, Mr. Craig adds, until General Sherman burned the court house and the jail.



The Women's Club of Fort Myers, Florida, of which Mrs. Thomas A. Edison is a member, saved this tree when there was talk of cutting it down at the time the court house was built. The tree is nominated for a place in the Hall of Fame by Mrs. Carolyn A. Brandon. (Photograph by Hunt.)

FAMOUS TREES

FROM Mrs. Elizabeth Stephenson Bentley, of the Calhoun County Historical Society, comes the information about and a picture of the sycamore which was a baby during the War of 1812. (See page 608.) Under this tree some time in 1831 or 1832, General Isaac E. Crary and Rev. John D. Pierce planned and worked out the present school system of the state: It was on a Sunday afternoon the men sat beneath the tree on a hill near the Calhoun County Court House. This hill is now occupied by the home of C. E. Gorham and the tree stands near the house. It has a spread of sixty feet and is in a good state of preservation. Crary afterward became the first Congressman from Michigan and Pierce the first superintendent of public instruction.

The Witenagemot (meaning assemblage of the wise) Oak (page 608), was planted in the spring of 1676 by Governor Andros as an emblem of peace between the Colonial government and several neighboring tribes of Indians, the Schaghticokes, among the rest. One thousand warriors were present at the ceremonies and many prominent representatives of the Colonial government added to the impressiveness of the occasion. This venerable oak stands a short distance in the rear of the old Knickerbacker mansion, on the south bank of the Hoosac River at the place where it is joined by the Tomhannac Creek, and the flats which prevail here were called "The Vale of Peace," or Schaghticoke Meadows. Washington Irving was entertained in the Knickerbacker mansion at different times, and it was here that he obtained his idea of the character, Diedrich Knickerbacker, which figures in his "History of New York."

A fine lesson is taught in such an act as that of A. E. Wiltse when a tract can be set aside for one oak tree in a State like California, famous for trees. (See page 609.) Some claim this tree rivals the famous Sir Joseph Hooker Oak at Chico, California, which was pictured in AMERICAN FORESTRY some time ago. The circumference of this oak is 31 feet and the spread of its branches is 130 feet while the age is estimated at between six and seven hundred years.

The Red Oak at Chesterfield is one of the most historic trees in the State of South Carolina (see page 609), and takes its place beside the famous Bluffton Oak under which the "Bluffton Movement" was born, which had a direct bearing on the Civil War. Of the oak at Chesterfield, Mr. Craig says he can see no difference in the tree now and the way it looked in 1852. He continues:

"My father's house was just across the street from this tree and the open court around it —a well of good water almost under its long limbs. The weary traveler could hardly resist the refreshing shade of this old tree and I have many pleasant and sad memories connected with it besides many handed down by tradition. The last tribe of Indians in this county, for whom the stream just under the hill was named, found this a place after their own hearts after trading their pelts for a jug of grog. For a long time you could find around this spot evidence of their stay such as arrowheads, pipes, etc. The slaves found this a favorite place to spend their Sunday evenings; when passing the oak I can yet hear their carefree songs and laughter. And oh! the frolics and fights I have witnessed under this old oak—in antebellum times we had "rooster day" every three months; there were always barrels of home-made cider for sale on this spot, and such cider is not known in these days—it had the sparkle of champagne and the kick of esqua-laugh. It first cheered the men up to all kinds of fun for the drill, then settled into the opposite direction and made them fight. If there were no old grudge to be settled, some bully would make a mark across this court and dare any one to cross the line; some other bully would soon accept the challenge and at it they would go. No weapons were used in these fights, so there was rarely ever any serious injury inflicted."

WAR MEMORIALS

A tree, a stone,
A church, a bridge,
A star, a cross
And flags—
O valiant ones
Who seek today
Adventure still and far—
What is there now
More fitting than a tree—
A strong young tree—
To keep your memory green?
A tree that sings
Of home and youth,
Of love
And loyalty;
A tree that has its roots
In cherished soil,
A tree whose branches
Wrestle with the storms;
A tree that makes an altar
For the sun, and knows, dear lads,
Even as you must know,
The thrill of life,
The urge of growth
And struggle,
The peace of jeweled night—
And the wonder of awakening
To find the Morning Star.

—Abigail F. Taylor.

A VETERAN GIANT OF ELMS

BY R. S. MADDOX

NEW ENGLAND is noted for her elms, and well she may boast of their magnificence. But thanks to the bountifulness of nature there is no particular monopoly on elm tree growth.

At Kingsport, Sullivan County, Tennessee, on the holdings of the Kingsport Farms, Inc., of which Mr. J. Fred Johnson is president, are some of the most magnificent elms in the country. Some were set out probably one hundred years ago on residence sites and others are growing where they happened to start. One of these elms is shown in the accompanying picture. It is near the water's edge of the north fork of the Holston River near Kingsport, Tennessee. Decades ago, in 1790, I believe, a company of Frenchmen traveling through this section of the State camped at different places, making a record of their trip and noting objects of particular interest. In writing of some of his observations after returning to France, one of the men mentioned particularly a wonderful elm and spring, the spring flowing from the roots of the elm, which description fits this magnificent old tree. He also is said to have given the measurement of this elm as 22 feet in circumference. The circumference of the spreading elm tree here shown is 25½ feet today, taking the measurement a foot from the ground on the uphill side. The elm and spring described by the Frenchman are in all likelihood the same as that on the farm of 2,300 acres now owned by the Kingsport Farms, Inc. The tree has a very symmetrically shaped crown and pendant lower limbs, with a spread which some have estimated at about 150 feet. If in 1790 this tree was 22 feet in circumference and is now 25½ as above stated, the probability is that it is more than four hundred years old.



THE BEAUTIFUL KINGSPORT ELM

Not only a magnificent specimen but one with a most artistic setting—beside the old brick silk mill on the Holston River.

This magnificent old tree through a misfortune of its own brought itself into prominence recently. During the summer its foliage was attacked by red spider and a fungus which defoliated it severely. During August a second crop of leaves began to put out and they are reported to have been attacked in the same way. Every effort has been made to get the tree sprayed but without success to date, and although late in the season it will be sprayed if it can be done within reason. Incidentally, an interesting feature of the landscape connected with the old elm is the building shown in the background. This old brick structure shows the remains of one of the first, if not the first, silk mill that was put up in Tennessee, if not in the entire South. Its builder and operator was Frederick K. Ross, who came originally from Virginia.



COMPARISONS ENLIGHTEN

This near view of the great elm gives a very comprehensive idea of its massive proportions.

CHANGE OF ADDRESS

It is urgently requested that all changes of address, whether temporary or permanent, be sent in promptly.

Both the old and new address must always be given.

Such co-operation will be helpful in avoiding the loss of magazines.

WHAT OUR NATIONAL FOREST POLICY SHOULD BE

BY LT.-COL. W. B. GREELEY, CHIEF FORESTER, U. S. FOREST SERVICE

I THINK we have had enough discussion of general principles of what a National Forest policy should be. I think that whatever disagreement we may personally feel in regard to particular figures, as to particular states or regions, we are all convinced of the fundamental fact that something definite and tangible must be done to restore the timber supply of the United States. I think we all recognize that the big objective of this effort must be to get growth on forest land that is not in demand for other uses than the production of timber. Starting from that basis, it seems to me that our forestry program in the first place must fit our existing forms of government; it must fit our existing and habitual ways of doing things; it must fit the recognized fields of jurisdiction of the different public agencies who should participate and of the private individual. We cannot nationalize all of the forest land in the country. At the same time, the public has a very large and important place in any program of reforestation; the public has, I think, very definite responsibilities. There are certain things that the public only can do. It is impossible to bring the forest fire hazard under control without public action, because you can never control forest fires without a vigorous exercise of the police powers lodged in the public.

At the same time, as I see it, there is a very definite, necessary place in this program for the private forest owner and the private forest industry. I do not want to see individual initiative eliminated. I want to see the enlightened timber interest of the lumber owner and the manufacturers of forest products given just as large a part in this forestry program as possible. I think at the same time that the forest owner must recognize that he has a responsibility as well as the public; that in the long run the forestry movement will increase the value of his land; that in the long run he has a responsibility not only not to permit the condition of his property to be a menace to his neighbors but not to permit the condition of his property to be a menace to the industrial welfare of his country.

In recognizing any such responsibility as that we must immediately couple with it the principle that what is required of the private owner must be equitable and fair in consideration of the conditions under which he is operating.

Taking these three angles then, the federal angle, the State angle, the private angle—it is my conception that a forestry program which will be effectual, which will accomplish results, must be built up on the principle of co-operation in which all three of these elements participate. That leads at once to one of the important points, more or less fundamental, as to what the relations should be between the Federal Government and the States. Very strong arguments have been advanced in favor of outright, positive federal control of the handling of forest lands.

Many of those arguments in principle cannot be answered and I do not take issue with them. The question as it appeals to me is the practical road, the tangible accomplishment. It does not seem to me wise to adopt a theory in attacking this great problem that is going to lead us through 10 or 15 years of controversy, of litigation over the constitutionality of enterprises arising from conflicting jurisdiction between the Federal Government and the States.

I feel that we will get results measured in actual terms of timber growth—and that is the only way that you can measure results—much more rapidly if we at least begin on a basis of co-operation that undertakes to give a fair recognition to the existing ways of doing things, to the American idea of handling locally the things which concern you locally. It is my feeling that the function of the Federal Government should be a co-operative one—that as far as possible it should deal through the State; that it should seek to correlate action between the states as far as it can in a co-operative spirit; it should set the pace; it should give the several states real leadership; it should give liberal financial assistance.

I think as a necessary correlary of this principle—the Federal Government working with the State through the State organizations—we must recognize the right of the Federal Government to insist as a condition of its co-operation, where it deems necessary, that certain standard requirements be met by the states. That is the only way in which you can make federal leadership and correlation between the states effective. As it becomes clear in dealing with this or that set of conditions that certain standard requirements must be met, those requirements must be made a prerequisite of federal co-operation.

Now, beginning with those general ideas, our legislative program in forestry, as I see it, must aim at five big things.

The first of these is to bring the forest fire under control. That represents 75 or 80 per cent of the whole problem. I would, if necessary, say for the next 10 to 20 years, forget everything else and concentrate all our energies upon that one thing of bringing our forest fire losses down to a basis where they can be figured on more or less as a fixed hazard or a fixed liability. That must include all classes of forest land. It must include the cut over land, the land that has been denuded by forest fires, the land once in timber but now cut and unimproved and now being made no use of; it must include in my conception, every class of forest land unless that land is economically in demand for some other use. I think that we must do a great deal along the line of studying the use of land, the practical classification of land to determine the types of land which in the long run we anticipate will be devoted to farm crops rather than timber growth, but the actual test which I would apply—and I would apply it as a matter of law—

is that we would regard any particular tract of land as forest land, to be protected as such, until that land is actually converted to other uses. In other words, a classification of land by actual use rather than by soil examination.

Our forest protection plan must include the disposal of slash. I have become convinced that there is no half-way measure; that we have got to make as a definite plank in our forestry program the practical fireproofing of our woods as far as we can within reasonable cost limits. The disposal of slash must, the country over, be recognized as a part of the logging operations. These things I would accomplish under the police powers of the State, applying the principle I stated a few moments ago, the Federal Government working as a co-operator of the State, and looking to the State to carry these requirements out with the private owners.

I said that forest fire control in my judgment would accomplish 75 or 80 per cent, possibly more, of the task of getting our lands back in timber growth, but there will be cases, there will be regions, where we must go beyond that, and as those cases and regions become clear, and as we know with certainty what should be done in addition to keeping out the forest fires, we should have the legal authority to make those essential things a requirement on the timber owner. Again, that principle must be coupled with a correlary that such requirements must be fair and equitable in consideration of the actual co-operating conditions; that they must be framed and enforced by local authority in which the interests who are affected can be locally represented and which will have the maximum opportunity to know the local conditions with which they are dealing.

In connection with these two planks—the first two commandments, as I see it, in our forestry program—the control of fire and the following of fire control with such other measures enforced by local authority as may be necessary actually to prevent the denudation of forest lands, I believe we should undertake to largely extend the existing public forests, for we have many areas of cut-over land which will come back into timber very slowly, perhaps not at all, unless planting is resorted to. I think that it is up to the Federal Government and the states to shoulder a considerable part of that work. I think that the Federal Government and the states in the forested regions should both embark on a policy of the acquisition of public forests.

The next point which I think everyone who has considered this question recognizes is a mighty important one is that of forest taxation. It is too big a subject to spend any time on here. It seems to me that the best way to tackle that problem is for each state whose forest resources are important, to work for the designation of a legislative commission which would be instructed to make a thorough study of the subject of existing methods of taxing forest lands upon the denudation of such lands and to report suitable legislation. The Federal Government might, if it were enabled to by Congress, co-operate with these states in making such a study of taxation.

Lastly, our forestry program should provide for getting much more accurate information on many of the questions that are involved. We need a much more accurate census or inventory of our timber resources, not only our standing stumpage, but our timber growing resources, than we have ever had. We need with that much better information than we have ever had on what our national requirements for timber are, region by region—what the requirements of our principal industries are, region by region. We need to get those two sets of figures to see how far we can fit them together, seeing how much land the country ought to have perpetually in timber.

These are the five main points which it seems to me our forestry program should aim at. There are, of course, others, but I have sheared them down to what seems to me to be the five essentials. How should we go at it?

In the first place, we should have, sooner or later, sooner if possible, a comprehensive federal forestry law. Its first plank should be an appropriation, which I have put at not less than a million dollars, to enable the Forest Service to co-operate with the states in forest fire prevention, in working out the methods of handling various classes of timber land, in addition to fire prevention, which are necessary actually to keep them in timber growth, and in other phases of forestry.

The expenditure of this million dollars would be regulated on the same basis as the expenditures under the Agricultural Extension Act and under the Federal Aid Road Acts,—that is, that the states must put up at least dollar for dollar with the Federal Government. The expenditures under that act should be further limited to states which meet what the Federal Government regards as essential minimum requirements in fire protection and methods of cutting; but I want to say right here that if such an act as that were passed and I were responsible for administering it, I would say to the states that the thing we want to get across first is fire protection.

The second plank should be one for extension of the federal forests by purchase and by consolidation through exchanges.

The third plank should be one that will enable the Federal Government to assist the states in working out this question of forest taxation.

The fourth plank should be a provision for a general survey of forest resources that I spoke of, and in that I would include, where it is necessary, co-operative studies with the state in regard to classes of land that should be devoted to forest purposes.

So much for federal legislation. Now, concurrently with that we need state laws which will carry out the state end of this game, because the plan that I have outlined is not going to be effective unless we get the states in it.

My idea as to state legislation is that you don't want to attempt too much in your law; that you have got to put your confidence in a commission, or a board, or some

(*Continued on page* 617)

LIVING STUMPS OF TREES

BY C. C. PEMBERTON

WHEN a tree is cut down it ordinarily dies or sends up sprouts from the stump or roots. Only a few conifers can sprout from the stump. In others the stumps usually die. In some species, however, instances are found of stumps which do not sprout but, nevertheless, do not die. On the contrary they retain their vitality to a surprising extent and apparently without the aid of foliage. There has been much controversy as to the cause of this remarkable state of affairs. Some aver that union of roots of the stumps with those of adjacent standing trees accounts for the phenomenon. Others contend that it is due solely to the reserve material in the stump, and in support of their contention point to instances of stumps apparently isolated and remote from other trees which nevertheless can make bulky formations of new annual rings.



DOUGLAS FIR

An example of remote and indirect root graft and consequent healing of stumps. A and B are healed stumps whose tap roots have grafted with the underlying roots of a large, foliage possessing fir tree fifty feet distant. D.D D. are the roots of the large tree spreading laterally at a depth of two feet below the surface. C is another small fir stump healed over, having only indirect union of roots.

According to a letter recently appearing in the *Victoria Daily Colonist*, Victoria, British Columbia, from Mr. A. D. Webster, Inner Circle, Regents Park, London, England, the healing over of these stumps had attracted attention in England early in 1800, and Grigor, an English botanist who died in 1848, had described them in his "Agriculture." French reviewers of the book, however, expressed doubts on the subject, saying that it was "as likely for a pump to draw water without a piston as for a tree devoid of leaves and branches to continue to produce annual layers of woody matter." Grigor, nevertheless, had been able to prove by "occular demonstration," the truth of his assertion, although no decision was reached as to the cause.

Professor Somerville, of Cambridge University, England, has lately expressed the opinion that though the phenomenon is usually attributed to the natural grafting of roots of the stump with those of adjoining trees left growing, the subject has not been sufficiently investigated. He distinctly states that, in larch, a certain amount of growth can take place in a *stem* that has been served, and that if such a stem is laid in a cool moist place, the cambium becomes active in the spring and a ten per cent annual ring can be formed in the ensuing season.

The matter seems to have received consideration also in Germany. In the Kew Bulletin (1917, Nos. 9 and 10, p. 303), Mr. W. Dallimore, in his instructive article, "Natural grafting of branches and roots," referring to these stumps, quotes Sorauer, Handbuch der Pflanzenkrankheiten, Berlin, 3rd ed., 1919, vol. I, p. 774, to the effect that while root union may often be the solution of the enigma, there are stumps too remote for such a possibilty which nevertheless show bulky over-growth. In the latter case, he thinks reserve material is responsi-



DOUGLAS FIR

This is an example of a natural root graft between two Douglas fir trees. To the left is portion of the trunk of the tree which retained its foliage and to the right the stump. The center of the stump is decayed, but the rim of live wood around the outer edge is plainly to be seen.

ble for the commencement of the overgrowth, but that it is subsequently stimulated by the chlorophyll present in the cortex of the callus.

Professor Jepson, a California authority, referring in "Trees of California" (1909, p. 33, Fig. 29) to the presence of these stumps in California, expresses the opinion that the phenomenon is undoubtedly due to natural grafting of roots. Professor H. S. Newins, of the Oregon Agricultural College, in the Proceedings of the Society of American Foresters for October, 1916, cites a number of cases in which he proved by actual excavation that living stumps which were apparently isolated were as a matter of fact connected by natural root grafts with standing trees.



DOUGLAS FIR

Remarkable manner in which stumps of the Douglas fir tree heal over when their roots are grafted to standing trees in the vicinity. After this cap was removed a renewed healing took place, as seen in the small piece in the center of this photograph. Another healing is now occurring in the cap from which the small piece was cut.



SCRUB PINE

This shows how the three trees are welded together in a natural graft of the roots and base of stems. Union of roots does not in this species (*pinus contorta*) enable a tree possessing foliage to keep the stumps of another alive by means of root graft.

I have made a number of such excavations and have never been able to find an instance in which uncovering all the roots did not disclose root unions, direct or indirect. One example of the latter was particularly noteworthy. On Langford Plains, near Victoria, there were a number of scattered Douglas fir trees of large size and well branched through growth in the open. About fifty feet away from one of the largest stood a group of nine small Douglas fir stumps completely capped over. No indication of root graft between the stumps and the big tree was to be seen. Chinese felling timber in the vicinity for firewood cut down the big tree, and as soon as they did so the vitality in the stumps ceased. I employed the Chinese to dig up the intervening ground between the tree and stumps and then the fact was disclosed that the spreading roots of the big tree, at a depth of two feet below the surface of the ground and at a distance from the tree of fifty feet, had formed a union with the tap roots of one or two of the group of stumps. These stumps, so united with the underlying root from the big tree, were in turn root grafted with the others of the group further away. It was, therefore, apparent that the wood forming material from the foliage of the big tree was transmitted by means of the root graft directly to some of the stumps, that they passed it on to

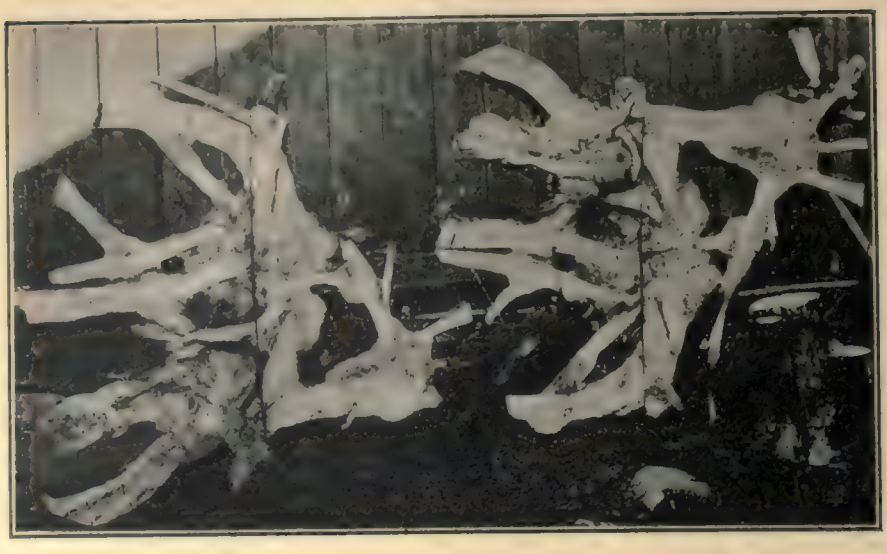


GRAND FIR

In the foreground are seen the living roots of a stump which has decayed away. The trunk of the big tree from which the live roots obtain their vitality through root graft is seen at the back of the photograph. These are Grand fir (*Abies grandis*).

others more remote, and that as soon as the foliage possessing tree was killed the source of the vitality of the stumps was gone and they too died.

This power to pass on by a series of successive and indirect root grafts, the vitality and wood forming material from the growing tree is in my belief the solution of the problem of how very remote stumps are able to show healthy overgrowth; especially as there are cases in which the major part of the stumps decay and the roots only remain alive. Not all species possess this power; and those which do not are unable to support living stumps no matter how closely the roots of the stumps may be intermingled with those of adjacent standing trees. The practical value of the characteristic still lies within the realm of speculation. Is it possible that some day we shall make use of it for the production of living fence posts or telegraph poles?



"SCRUB PINE"

The only scrub pine Mr. Pemberton could have worked on in B. C. is the coast form of the Lodgepole Pine, which is locally called "scrub pine." This section of the three trees shows how completely they are joined together by natural grafting. Most pines do not appear to possess the power to heal stumps by root graft.

While in some species such unique consequences follow the joining together of roots, which takes place so readily in conifers, in other species it is quite different and they do not possess the power of transmitting vitality even when roots are directly joined together. I have seen an instance proving this. At the first Camp in France of No. 34 Company, Canadian Forestry Corps, intergrafting of the roots of the pine trees was found to be of frequent occurrence. In one instance three trees were very closely united. The bases of the stems and the roots of the three trees were all welded together. One tree had been cut down some time previously, and though its stump was charged with resin there was absolutely no sign of vitality.

THE OLD TREE IN THE CITY SQUARE

BY GARNETT LAIDLAW ESKEW

The ringing clank of the axes
Sounds through the spring time day;
The saw eats into the tree trunk;
The old trees totter and sway.
There is a moment of rending
Like the breaking of old home ties,
Then a thudding sound on the soft wet ground—
Another old resident dies.

Time was when the old tree blossomed
And made through the summer's heat
For the old time folk on the benches,
A leafy and cool retreat;
When each year broadened and added
To the mighty expanse of bough—
But the gaunt arms there up above the square
Are barren and colorless now.

Time was when the mad throngs passing
Along through the city's glare
Saw the huge old tree, and remembered
That God had his temple there—
Remembered the hills and the moorlands
All dressing in green again—
And who shall deny that they all passed by
Better and worthier men?

Today I paused in my passing
And looked where the old tree lay—
A mighty and fallen warrior
Hewn through at the end of the fray.
And I counted them slowly over—
The rings that have marked each year—
Oh our sires were young when that tree first sprung!
And now, it lies quietly here.

And I wonder, when *my* fight is over
And I have lain wearily down,
Will someone step for a moment
From the rush of the noisy town
And count all my life time over,
And say, "Loads are lighter a bit,
And the world goes by more happily
Because *he* has lived in it?"

(*Continued from page* 613)

form of state authority dealing with forest questions that will have authority behind it in the laws of the state to determine what is necessary within reasonable limitations; to apply these regulations and requirements to the private owners of the state subject to some provision for appeal, or review in cases where an individual private owner feels that the state commission has been arbitrary or has exceeded its authority.

I would authorize that state commission, in the first place, to establish a sufficient fire protection organization to control the fire situation of the state; with a sufficient appropriation to carry that out, but with the provision that every private owner who benefits from that protection must contribute a fair and proper share to its cost. I would authorize the commission to levy the cost of fire protection upon the lands of private owners who will not contribute voluntarily—to make that a lien upon the property; but I would put, probably in the law itself, some limit as to cost per acre, some equitable limit, beyond which your commission cannot go.

I would authorize that commission to deal with the question of slash disposal in the same way, giving them authority to prescribe the methods of slash disposal applicable and practical under this and that set of conditions. Don't limit them in the law to details, limit them as to a total cost; put the protection to your timber owner in that form. Third, I would give the commission authority, subject to appeal, to determine what other method should be employed in the way of restrictions in cutting timber in order actually to prevent the devastation of the forest lands of the state. I would make that commission non-partisan in character. I would provide definitely for the representation of other interests in the state upon it, in accordance with whatever the best arrangements may be in each state, to get a representative non-partisan commission that will hold the confidence of the public and the state. That is the first and biggest feature, in my judgment, of any effective state forestry law.

Now I would follow that, in outlining a complete or ideal state program, with some provision in each state, even on a small scale, if necessary, for building up state forests. Personally, I cannot agree with the proposition expressed by Governor Philipp here yesterday, that the duty of growing timber is entirely a duty of the national government. It is a duty of the national government and they should go at it, but it seems to me that it is a responsibility that the states also share. It seems to me that Wisconsin, Minnesota, and Michigan have an obligation to their own citizens, to their own welfare, their own future taxable property, and future industry to take an active hand in this proposition of growing timber. I am for state forests as well as federal forests.

The third point is the question of taxes, upon which the only suggestion I can make is one of investigation and publicity through the designation of a legislative commission. There are a good many other things that would be desirable in this or that particular state. I have not touched on state nurseries and I think that it is important in some prairie states to go into that phase. The things which I have mentioned are the essential things.

There is only one way to get this program accomplished, and that is by all taking hold of it; by creating a public demand for this kind of legislation that Congress in Washington will have to recognize, and that your state legislatures in the various states will have to recognize. I want to see the men and business interests who are most directly interested in this take the leadership in this fundamental public task. The American Pulp and Paper Association has already formulated and approved definite forestry proposals, many of which are quite in line with what I have outlined. The National Lumber Manufacturers' Association, through a Forestry Committee, which recently held a meeting in Chicago, has also formulated a set of principles and certain proposals for federal legislation which represent, by and large, an advanced position, a creditable position, for that industry to take.

It seems to me that all that we can add to the consideration of these questions, all the support and impetus we can put behind this proposition, means that we will get a definite somewhere that much sooner. I would like very much to see the interests represented here take some action which will enable them collectively to give the proper consideration to these proposals and to other proposals, and to be prepared when the proper time comes to make their voice and their influence felt.

(Extracts from an extemporaneous address delivered at the reforestation conference of the wood-using industries held at Madison, Wisconsin, July 23, 1920. This is the clearest presentation of the Forest Service program that has yet been presented.)

NEW METHOD OF TAGGING TREES

LINEN cloth is now being used in some of the experimental work of the United States Department of Agriculture in tagging trees and has been found to be very successful. Writing on wooden tags, which were formerly used, soon becomes illegible, while copper tags are not only expensive but are not large enough for sufficient data. The linen tags are first soaked several days in water to remove the sizings and then dried and smoothed with a hot flat iron. Data is written with India ink using a round-pointed pen. The ink soaks in but does not run. Such tags will last a year or longer. When they are to be used for longer periods or under conditions where the tags come in contact with the ground, they are coated with paraffin after labeling. One method is to dip them in a mixture of gasoline and paraffin (proportion 1 quart of gasoline and one-half pound paraffin). The gasoline evaporates leaving a film of paraffin. If the tags become coated with mud they can easily be washed and the ink shows up clearly. Such tags may be used in a variety of ways, for when treated in this manner they last exceptionally well.

NUT TREES IN LANDSCAPE WORK

BY O. C. SIMONDS, LANDSCAPE GARDENER

ALL trees are beautiful and should serve in some place in landscape work. Some are more beautiful than others and where but few trees can be used the more beautiful would naturally be chosen. Much attention is now being given to the planting of nut trees on home grounds, highways, parks, city streets, boulevards, country roads and elsewhere.

Not long ago a lawyer was talking to me about the beauty of black walnuts. To his mind there was no tree more beautiful, and, from what he said, he would use it almost to the exclusion of other trees. My own judgment does not fully coincide with his, although I consider a black walnut a very attractive tree. It grows to a large size and is generally healthy. Its shape is good and its foliage attractive in summer. The leaves usually drop early and they are not especially attractive in autumn coloring. Black walnuts are strong in appearance. They lack the gracefulness of the elm and if I were making a list of trees in the order of their appearance, placing the most beautiful first and the least attractive last, I should place several trees ahead of the black walnut, among them sugar maples, elms and several of the oaks. Perhaps the black walnut would come about in the center of the list for most locations. The list itself would vary for different situations and climates. I should advise using black walnuts plentifully along the highways, especially country roads, and somewhat sparingly in home grounds and the other locations which I have named. By plentifully I do not mean to the exclusion of other trees, for, in most places, there should be more elms and maples than black walnuts, but highways are so extensive that many kinds of trees could be used in abundance to give shade. In woods there might be places where black walnuts could be used in profusion.



THE EXQUISITE BEAUTY OF AN ALMOND ORCHARD IN FULL BLOOM

The objections that one might raise to the use of black walnuts would be, first, the comparatively short season of the leaves. These come out rather late in the spring and drop early. Probably these trees can not be improved very much in this respect. Second. Boys will sometimes throw sticks at the trees to bring down the nuts. If a boy comes in home grounds to do this he will be considered a nuisanse. Branches are sometimes broken and trees disfigured from this cause. Along highways this objection might perhaps be lessened somewhat by



A BEAUTIFUL AND EFFECTIVE PLANTING OF ENGLISH WALNUTS ON A BROAD AVENUE



THE DISTINCTIVE BLOSSOM OF THE HORSE CHESTNUT

planting enough trees so that there would be more nuts than the boy would want, or by improving the manners of the boy. Third. The trees are often attacked by great numbers of caterpillars. This objection can usually be obviated by spraying or destroying the pests in other ways.

What has been said about the black walnut would apply in many ways to the butternut, its nearest relative. Butternuts have a range extending farther north and they are more subject to disease than the black walnuts. Like the walnut, their leaves come out late and drop early. They are subject to the attacks of boys. When healthy they are attractive in appearance and deserve to be planted in most places where trees are used for landscape effect, but in the list suggested they would come below the black walnut.

There is a time in the year when the shag bark hickory, which produces such sweet nuts would be more attractive than any neighboring tree. It is when the big buds swell and send out yellowish-green leaves surrounded by large red bracts. At this time they are as showy and beautiful as any flower. The bracts soon fall, but the leaves turn a rich green and are attractive until early fall, when they are sometimes yellow, and sometimes drop without any marked coloring. The trunk of this hickory is unique in appearance as the bark separates from the tree in long plate-like strips which hang on at one end and give the scraggly appearance from which the tree derives its name. All of the hickories are attractive in appearance, but some of them drop their leaves early. The hickories are difficult to transplant but this is nothing against the beauty of the tree. An established tree is more valuable on this account. In some places hickories are quite subject to disease or to the attacks of borers.



A CHESTNUT, HEAVY WITH FRUIT. SUCH A TREE IS A COMMANDING FIGURE IN ANY LANDSCAPE

Like the walnuts, hickories which produce edible nuts are subject to the attacks of boys, but, on account of the toughness of the wood and the roughness of the bark, they are usually quite well able to withstand these attacks. Hickories are suitable for use in all landscape work so far as their appearance is concerned. The fact that they are not so used is due to the difficulty of transplanting them. In the fall when a maple tree has colored up beautifully and a hickory near it has dropped its leaves, we are apt to compare the two unfavorably to the latter, but we should remember the appearance in summer and especially when the leaves first unfold. Hickory trees are beautiful also when the leaves are off, their branches making beautiful etchings against the sky in winter. The pecan, which is the largest of all the hickories, is an exception to the general rule because it is planted quite extensively, especially in the South. It is a beautiful tree and where it is hardy there is no reason why it should not be used as a street tree, a tree in home grounds, in parks, or any other

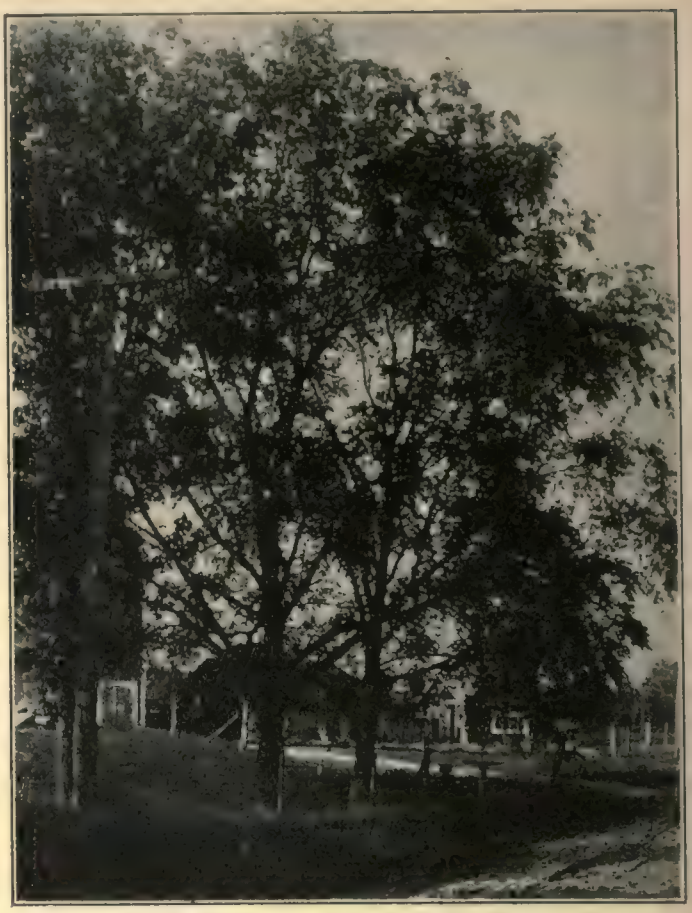


DELIGHTFUL LANDSCAPE EFFECT SECURED THROUGH USE OF PEPPER TREES ALONG THE CURBING OF A STREET IN PASADENA, CALIFORNIA

place where deciduous trees are needed. It is raised extensively in some nurseries, while the other hickoris are raised very sparingly, and some not at all.

Many consider the beech the most beautiful of all the nut trees. Its comparatively smooth, bluish-gray bark makes it a distinctive tree at all seasons. Its branches, spreading straight out from the trunk, give it an appearance of strength. Its fine branches from a specially pleasing skyline, its sharp buds are trim and neat in appearance, its leaves are beautiful in shape and texture. Their fall coloring, while not as brilliant as that of the maples, is really beautiful, being either yellow or a rich brown. The leaves are apt to hang on all winter, especially on the younger growth, and then they often turn a beautiful straw color. If a list of beautiful trees for February were to be made, I am rather inclined to think that the beech would stand at the head of the list. A young beech, with its bluish-gray bark, its straw-colored leaves, and flecks of snow here and there, seems to me the most beautiful of all deciduous trees in winter. The young leaves also are especially attractive when they first appear and the blossoms are sometimes objects of interest, although not showy in color.

Often in old pastures one finds forlorn, scraggly looking bushes and is told they are hazel nut bushes. One would not pick out bushes like these to plant in his front yard, and yet, when given a chance, there is scarcely a more attractive shrub than the hazel. It is one of the first shrubs to blossom, the staminate flowers hanging in slender graceful yellowish-brown catkins, while the pistillate flowers are little points of purplish-red protruding from the buds. These blossoms appear long before the leaves. The latter, when fully developed, are beautiful in outline and soft in texture and they have a rich coloring in the fall including various shades of yellow and red. The hazel should certainly be used extensively in landscape work. The nuts, with their leaf-like involucres, are attractive in appearance in August and September. In connection with our own hazel one would naturally think of the filbert, which is a European relative. The filbert is often planted for ornament, and a variety with purple leaves is quite popular.



THE INCOMPARABLE BLACK WALNUT, ALWAYS BEAUTIFUL

Of all our native trees I think the oak excels in beauty of foliage. By many, oaks might not be considered nut trees, but nearly all of the acorns are eaten by squirrels or other wild animals and so it would be proper to mention oaks when speaking of nut trees in the landscape. In the northern states we have two groups known as the white oak group and the red oak group. The trees of the former have soft, dull green leaves with rounded lobes, while those of the latter have shiny leaves with lobes ending in points or filaments. The former mature their acorns in one year, while the latter require two years to bring them to maturity. The acorns of the white oak group are sweet, while those of the red oak group are more or less bitter. The foliage of all oaks is attractive when it first appears,



FINE EFFECT OF HORSE CHESTNUT PLANTING ON A WASHINGTON STREET

the small leaves varying in color from almost white, through pink, yellow and red to the deepest purple. Perhaps the red oak excels all other trees in the beauty of its summer foliage and its leaves are also richly colored in autumn. The Bur Oak, in addition to having attractive foliage, has a rough dark bark that gives it an attractive appearance in winter. The white oak, especially when young, holds many of its leaves until spring, and these, with their brown color, give a warmth to the snowy landscape. One could make a most beautiful park by planting nothing but oaks and they should rank with maples and elms as street trees.

The chestnut is a tree which a few years ago would have been considered along with the oak in landscape work, but which now would not be thought of in certain regions on account of a disease which has practically destroyed it. It grows to a large size and, if it were not for the chestnut blight, would be worthy of a place in any park. Hundreds of thousands of dollars have been spent without success in endeavoring to exterminate the blight. Some of the introduced varieties are apparently exempt from this disease, but only the future can tell whether the chestnut will again become valuable in landscape work as well as in the raising of food and lumber.

In designing landscapes we think first of open spaces and then bound these spaces with trees and shrubs having pleasing shapes and foliage. The tops of these trees form the skyline and the lower growth a margin of lawns, or perhaps of walks and drives. For these purposes the beeches, hickories, hazels, walnuts and butternuts are all valuable, their value being approximately in the order named.

There may be some question about including the horse chestnuts and buckeyes in a list of nut trees. The seeds of these trees have, however, been used for feeding stock and perhaps some way may be found for making them available as food for men and women. There is no question about their usefulness for ornamental trees. In Europe the horse chestnut has been used extensively for park and boulevard planting and it is also largely used in the United States. There are several varieties. The leaves appear very early, the blossoms coming out later. Our own buckeyes are handsome in appearance and all are adapted for use in landscape work.

The arguments for and against the use of nut trees in landscape work would be somewhat similar to such arguments regarding fruit trees. The tree with luscious fruit, like the snow apple, would be omitted from the list of trees for a park, not because it lacks beauty, but because its fruit would lead to its destruction. Apple trees might, however, be very appropriate for private grounds. They have sometimes given a name to a home, as "The Orchard." The same is true of certain nut trees, "Walnut Hill" and "Hickory Grove" being not uncommon. The hazel, too, is frequently used in naming home grounds, streets or localities. A name used in this way has a real and intimate meaning. I am glad there is a movement to encourage the raising of nut trees and hope to see such trees used extensively for the purpose of developing attractive scenery as well as for food production.

THE SOAP NUT TREE

"MY attention has been called to an article in AMERICAN FORESTRY on the subject of the soap nut tree," writes Dr. M. B. Carleton, of Wooster, Ohio. "I suppose it is the same tree that is indigenous in India along the outer ranges of the Himalayan Mountains about the latitude of the middle of Florida. I was born in that country and lived most of my life there. I have often seen the tree and used the skin of the fruit, or nut, in washing clothes and even used it in bathing. It makes a splendid lather and is highly prized in the washing of woolen clothes, for the garments do not shrink as they do when the ordinary soap is used.



SOAP NUTS—FRUIT OF THE SOAP NUT TREE

These curious nuts resemble the peculiar Li Chi (Chinese) nuts of childhood, but in appearance only, as the Chinese nut has a delicate, delicious flavor, while the Soap Nut is unfit to eat, its value lying in an entirely different direction.

"The tree is a symmetrical and handsome one, with many fine dark green leaves and grows to the height of 40 or 50 feet. One tree in my garden supplied enough fruit for the laundry of my family of seven persons for a year.

"The outer skin only is used. When the fruit is dry it is easily broken into small pieces by hand and then mixed in plenty of hot water. There is a round black [illegible] within the outer skin which moves and rattles when ripe. The tree is easily grown from this black seed which is as large as a good sized cherry. It is not best to use the lather in washing the face for if it enters the eye, there is much smarting and irritation though I never heard of any permanent injury to the eye and the irritation soon passes off, as I have experienced.

"The fruit, or nut, is nearly the size of a small walnut and is bulky to carry, but the shell can be removed and broken into small pieces to make it compact and more easily transported."

"ALMOST EVERY PAPER THAT COMES

THE continued drive of the American Forestry Association for a national forest policy and for better fire protection for our forests is "found in almost every paper that comes to hand" according to the editor of the Burlington *Hawk Eye* who has a fine editorial on the way the newspapers are co-operating in keeping this all-important subject before the readers. Every phrase of the situation is being discussed by the editors all of whom demand action by the Government. The *Literary Digest* has just devoted two pages to the Association's work.

Burlington, Iowa, Hawkeye: There has come, within quite recent times a notable change in the attitude of the American press toward the question of forestry. Not so many years ago, many papers spoke of forestry slightingly. They opined that it was something that might be useful in foreign countries, but of which there was no need here. The majority ignored forestry entirely.

Today, it is impossible to run through twenty or thirty papers without finding at least one article on the subject of forestry, and sometimes almost every paper that comes to hand has something dealing with the subject.

Now, it would not be fair to assume that this change has been wrought simply because paper is made of wood pulp and newsprint paper is now very scarce and very expensive. That may have helped, but it is not the only cause, nor the principle cause. Not even the high price of lumber may be assigned as the cause.

It is rather that the men who study public questions and public needs have arrived at the conclusion that it is high time that the subject was receiving some attention and that it was found by this time that the agitation should have begun years ago. For a need such as exists in the country now cannot be filled in a few short years. It may require a century to give this country the wealth of forest which it requires.

But the main thing, the outstanding thing, the thing that guarantees results, is that the press of the whole country is awakening to the fact that a crying need exists. And that means that the politicians who are always anxious to please the people, will take up and study the problem. The legislatures of the different states and the National Congress may be depended upon to take the hint and to follow where the press leads. Especially, as they will soon learn that the people stand behind the press in this matter.

San Diego Union: Two measures of vital importance to the future economic welfare of the nation were presented for consideration by the resolutions committee of the Republican convention, both of them pertaining to the conservation of our forests. One of the propositions provides for reforestation as a precaution against a famine in all wood products within fifteen years, and the other was in the form of a protest from the American Forestry Association against President Wilson's "pocket veto" of the water power bill.

The two measures are virtually to the same purpose. Conservation of the forests is the chief factor in conservation of water power. If the forests are cut away, the streams will rush in floods to the sea during the rain period, and go dry in the summer and autumn. If there is no water in the streams, there will be no source of water power. This is the plain logic of the impending emergency.

As to the "wood famine" predicted within fifteen years, the statement might be sustained in the fact that there is a scarcity of wood pulp for the making of print paper; but this argument is somewhat weakened by the allegation of expert observers that there is a vast quantity of the timber material used for this purpose still standing in the forests of the Northwest. However, that may be, it would still be necessary to preserve the spruce. This can be done without affecting the supply to the paper mills, by scientific legislation regulating the harvest and by reforestation.

The same policy should be pursued in all other forest legislation. Preservation and conservation go hand in hand. Building lumber is high in price, whatever the cause, and it will be much higher if it is cut out indiscriminately and wastefully, as is being done at present. Every mature tree in a forest should be replaced as soon as it is converted into marketable lumber.

Closely allied with the two propositions mentioned is the plan proposed for forest planting on unforested areas. This proposition is particularly applicable to the needs of Southern California, and should invite attentive consideration by the business and industrial interests of San Diego. Our water power could be immeasurably increased if the water sheds of our mountain regions were more thickly forested, and the timber line brought nearer to the valley and coast region. Water power for the generation of electrical energy is certain to be of paramount importance to San Diego industry as the oil fuel supply diminishes. Our municipal water supply and water for irrigation are also matters of great concern to us, and closely related to the propositions for reforestation and conservation of existing forests.

During the war we were forced to practice a thrift with which most of us were sadly unfamiliar; since the war conditions have been such that thrift is again forced upon us in the universal necessity of meeting the demands of the high cost of living. Here are two lessons which we should take to heart with the resolve that the experience shall serve all future economic

Boston Traveler: Mr. Charles Lathrop Pack, head of the American Forestry Association, congratulates the nation upon the fact that the next President of the United States will be a newspaper publisher. For Mr. Pack believes, probably with reason, that the forestry needs of America will be apt to receive their due share of attention from a chief executive who has known what it is to wonder where his next cargo of newsprint was coming from.

It is certainly true that the newspaper publisher, whenever you meet him, is concerned in a special degree, if not over his supply of newsprint for current needs, at any rate over the continuance of that supply for himself and other publishers in the coming years.

To be interested in the matter of pulpwood for paper making is to be interested in the entire problem of timber for the building and manufacturing requirements of the nation. At the present rate of consumption and without a policy of reforestation, the timberlands of the United States will be depleted in sixty to seventy-five years. With proper co-operation of national and state governments and private owners of forest areas, experts tell us, our forests may be made to renew themselves in time to meet domestic needs for many years to come.

No wonder, then, that the people who have been devoting time and energy to the forestry campaign are cheered by the assurance that the next President will be a man with a practical interest already awakened in the perpetuation of the nation's timber supply.

TO HAND HAS SOMETHING ON FORESTRY"

purposes. We can never hope to prosper by wasting our substance. Our forests are national wealth and one of our most valuable assets of future prosperity. We must not waste them. Let them be not only conserved, but multiplied. We shall sorely need them by and by.

Rochester Herald: W. B. Greeley, chief forester of the United States, declares that there are in the United States a hundred million acres, or about 5 per cent of the total area, capable of producing trees, and fit for nothing else, that are not being put to any sort of use. On much of this land no taxes are paid. Now it is evident that this vast area cannot be brought under tree cultivation by viewing the future with alarm or by scolding the past for its wastefulness. The work of forestation on Government lands can only be done by a comprehensive and continuous programme, backed up by a sufficient appropriation, and on lands privately owned, by agitation and education. In our treeless wastes there is great potential wealth, and we owe it to the generations coming after us to make a start on an extensive plan for the forestation of these areas, that the wealth may be made real. We have had about enough speculation on the subject. It is time now for action.

Indianapolis News: The report of the committee on forest conservation of the American Paper and Pulp Association is significant largely because it agrees in the main with other reports made by other associations having various objects in view. The paper and pulp interests investigated the forest situation with a view to suggesting means of providing for a permanent supply of raw material for the industry. Their committee found that this can best be done by adopting a conservation and reforestation plan similar to that suggested by the American Forestry Association and various State organizations interested in forests.

The forests now existing must be cared for and their products distributed with due regard for conservation. They must be surveyed so that the Government will not have to depend on vague estimates as to the forest resources of the country. New forests must be planted, and not only planted, but constantly watched by experts and developed under expert supervision. Means for research should be provided, and the Federal Government should encourage the States to adopt State forest policies to conform to the national policy and to harmonize with the Federal forest policy. The States can aid in encouraging the planting of poor farm land in forests.

As to how far the Federal Government should go in acquiring forests and land suitable for developing into forests is a question that must be considered. Manifestly, it is unwise to give the Federal Government a monopoly of the raw material for print paper. In the hands of dishonest politicians, such a monopoly might be used with telling effect. The national forest policy item in the report lacks a suggestion as to how this danger can be obviated. It is probable that strict supervision and regulation of privately owned forests is to be preferred to Government ownership of vast tracts, but the Government should own forests for experimental and park purposes.

TO POVERTY OR PROSPERITY



THE SIGNBOARDS

One road leads to destroyed resources, lost lives and homes, diminished pay rolls, dwindling markets, higher taxes; the other to life and property safe, market for crops, pleasant camping places, fish and game preserved, community wealth. Which shall it be? So says the Pueblo Colorado *Chieftain.*

Waterbury American: "The Next Step in the Forestry Program" is the title of the last report of the committee on forest conservation of the American Paper and Pulp Association, which has just been published in pamphlet form. All persons interested in the forests of this country, either as a source of raw materials for our industries, or for other purposes, will be interested in what this committee has to say.

The report says that wood pulp is the chief constituent of approximately 90 per cent of the paper manufactured in this country today, and that the amount of news print paper and other papers manufactured from wood has been increasing tremendously for the past 10 years. The increased production of paper from pulp has resulted naturally in increased demand for timber, followed of course, by diminishing supply and increasing cost of raw materials. The committee which prepared the report believes that the time has now come for definitely drawn acts of legislation and recommends that authorization be given the committee to proceed immediately in the formulation and introduction into Congress of a bill embodying an adequate national forestry policy upon the general theory that in addition to the direct activities of the National Government, a comprehensive forest policy requires co-operation of the States, since State forest reserves will contribute to national wealth and the products of such reserves will be used by States that are non-contributory. Hence, aid in the State development of forest wealth available for interstate consumption should be contributed by the National Government. An annual appropriation of $6,000,000 for forest extension, care of forest resources and for research, is asked for, the amount to be expended in each State to bear relation to the amount appropriated for the same objects by the State itself.

The recommendations, the committee says, can not be criticised on the basis of the expense involved, which is exceedingly moderate in view of the magnitude of the problem to be solved, and represent true economy in the treatment of a basic national resource.

Paterson News: The American Forestry Association has issued an appeal to every school in the country to plant a tree. Tree-planted schoolhouse grounds will serve several ends. If every schoolhouse could be made a center of pretty landscape gardening, the idea would spread from the children to the homes. People would want the grounds around other public buildings improved. The unsightly railroad stations and other structures which now serve the public so shabbily would be given a setting of foliage.

Children who acquire this idea of beautification will keep it when they grow up. When they move to a newly laid out street they won't be content with treeless land and shrubless soil, but will want a nest of verdure around their homes. This will improve property, make real estate more valuable and give a town a reputation for improvement spirit. These children would be apt to become more interested in trees, learn how much value they add to waste land, and perhaps do some reforestation if they ever own land.

OLD MAN OF THE MOUNTAIN

BY GUY ELLIOTT MITCHELL

ONE of the most remarkable human faces in stone is a giant profile which rears its head above the eternal glaciers near the topmost slopes of Mount Ranier. This enormous face, fashioned with most singular fidelity in the image of man, is a remnant of the cone of Ranier when the mountain was an active volcano. It is a precipitous mass of rock and is known as "Gibraltar."



GUARDIAN OF THE MOUNTAIN TOP

The head of the recumbent giant, easily pictured by the imagination stretched at length and calmly guarding Ranier's slope through the ages.

The face is perfect in every lineament, chin, lips, nose, deepset eye, and overhung brow and forehead. The back of the head is covered with a thick hood. The face is set at an angle of about 45 degrees, apparently gazing up into the heavens, and it requires the exercise of but a slight imagination to conceive the giant recumbent body below the head, the trunk and the huge limbs lying at full length on Ranier's slope, a thousand yards from head to feet, and covered by the white blanket of the eternal glacier. Surely this is the most gigantic natural sculpturing of our continent.

WESTERN hemlock and spruce are the standard mechanical and sulphite pulpwoods for the United States mills in the Pacific Northwest, the hemlock being consumed in greater amounts than any other single species. Hemlock forms 60 per cent of the merchantable stand of timber on the Tongass National Forest, Alaska.

IRRIGATION AN ANCIENT PRACTICE

BY JAMES R. PREDDY

IRRIGATION began in Texas many years before the lands embraced within its boundaries became a part of the United States, years before these same lands made up what was known as the Lone Star Republic. To bring the time down to a more tangible date, the first irrigation work was done—according to tradition—when the Pueblo Indians constructed the peculiar ditches about El Paso and the Pecos country, which authorities of today claim were built for irrigation purposes. Another tradition coming out of the past tells that these ditches were built by the Yuma Indians when they were driven westward by the Comanches and Apaches, and not by the Pueblos. When Coronado, the roving explorer, opened this country to the Spaniards he found well-worked irrigation systems among the Indians; this was in 1540 when he was pushing toward the North. The practice of irrigation was continued under the Franciscan Fathers, who constructed the five mission ditches that were found near the present city of San Antonio. Even under Mexican rule the work did not stop, and grants by the Mexican government often read as follows:

"In the name of the Mexican Nation, grants him one day of water with its corresponding labor of land."

Little advantage was taken of the early start made by the forefathers of Texas until a comparatively recent date. Too long was the statutory encouragement to irrigation delayed, although many a man with an eye to the future saw the great possibilities stored up in the waters of the Texas torrential streams as they wasted out into the gulf. Texas' lands were probably worked for irrigation before those of almost any other State, but when one considers intensive cultivation of the last twenty years, it must be admitted that the Lone Star State has been backward.

Irrigation first came into recognition of the law in 1875, but the acts passed at this time were of no more practical value than were the acts passed thirteen years later. Ten years after this the need for better irrigation began to be felt in certain sections of the State, and this led to the passage of acts which recognized the need for irrigation works in these specific sections. In 1913 the Thirty-third Legislature became impressed with the gravity of the conditions throughout the State, and enacted a statute which created a Board of Water Engineers, into whose keeping the water resources of the State were given. At the present time this board may be said to be the trustee for the State of all water resources.

When the three members appointed on the board came together for the first time and looked the situation over, they found that the field before them was set with difficulties, and yet that it was a field rich in possibilities. Each of the three members on the board were appointed as representatives of one of the three water divisions into which the State had been divided by the Legislature. Later legislation declared certain waters State property, determined the purposes for which water may be stored,

(*Continued on page* 636)

UNIQUE EXAMPLE OF THE PROPAGATION OF SUGAR MAPLE FROM A CUTTING

BY GEORGE B. SUDWORTH

THERE has recently come to my notice through Major Edward K. Campbell, of Clermont, Florida, a most interesting story of how he propagated a sugar maple, now a large tree, from a cutting. As is known, practically all of our native maple trees, and many, also, of the important exotic species, are grown from seed. A few of the fancy, shrubby maples of foreign origin, such as *Acer palmatum, A. cissifolium,* etc., may be propagated by layers and cuttings. It is probable that our native vine maple (*Acer circinatum*) could be grown from layers or cuttings. The red-foliaged and cut-leafed and other fancy garden forms of Japanese maples are commonly grafted on the root-stock of a closely related species. Personally, I do not know of another instance in which the sugar maple was grown from a cutting.



THE SUGAR MAPLE WHICH WAS SUCCESSFULLY PROPAGATED FROM A CUTTING

This is the tree which Major Campbell grew from a twig cut from a sugar maple in 1859 and stuck into a potato to root. It is now 60 years old—a magnificent specimen 90 feet high, and the pride of the owner.

Major Campbell informs me that in 1859 when he was a lad of 15, living on a farm in Windham County, Vermont, he cut a twig from a mature sugar maple tree, and sticking the cut-end of the twig into a potato he planted the slip, potato-end down. He said it was common talk among farmers that slips of fruit and other trees could be rooted in this way. Being curious to know if a maple could be so grown, he planted the maple slip in early spring, before the buds had opened. The twig took root, and for three years (1859-1862) he protected and otherwise cared for it.

Leaving the locality in 1862, Major Campbell said he had seen his maple thereafter more or less regularly every few years, up to the present time. At an age now of 60 years, the tree is about 33 inches in diameter and 90 feet high. The photographs taken by Miss Lydia B. Franke, of New York City, show distant and near-by views of the tree. Major Campbell is standing in the nearer view. The tree is growing at the foot of Lede Mountain, in Windham County, Vermont, the old farm on which it was planted now being known as "Fairmont Farm," owned by Mr. H. A. Bennett, South Londonderry, Vermont.

While I personally know of no other instance of sugar maple having been grown from a cutting, it is, of course, quite possible that some one else may have accomplished this feat.

FEATHERED SENTRIES

VERY soon after the beginning of the war it was noticed that cats, dogs, pet and even wild birds, as well as chickens, ducks and geese were aware of distant battles or of the approach of enemies," writes Ladd Plumley in the January number of Boys' Life. "All over the north of England the keepers on game preserves noticed that the pheasants became excited and squawked their alarm when a naval engagement was taking place in the North Sea. In France the approach of hostile airplanes was foretold by the uneasiness shown by bird pets. Early in the war parrots were placed in the Eiffel Tower to give warning, long before human eyes and ears could detect the fact, of the approach of enemy planes. Very soon, however, the parrots became useless, as they became familiar with hostile airplanes and no longer showed the least interest.

"Of all the animals and birds that gave their warnings as sentries, during the initial stages of the war, the bird that by some strange mixup in ideas is supposed to represent stupidity showed the most amazing instinct in detecting coming danger. In August, 1914, throughout Belgium and northern France the village geese

hissed and screeched their warnings long before the enemy appeared. Possibly the geese felt in their broad webbed feet the vibrations of the earth caused by distant gun and cannon fire, or, perhaps, they detected the air vibrations."

FURNITURE MAKING IN BRAZIL

THE American Consul at Rio de Janeiro reports that before the European war furniture and other manufactures of wood were imported into Brazil to the value of more than a million dollars annually but now Brazilian and Italian workmen in that country are able with Brazilian woods to imitate imported furniture so perfectly that the resulting article is often more beautiful than the model.

While the Amazon district and the extreme north are famous for their dyewoods and Parana is the home of Brazil's soft wood, Rio de Janeiro and Sao Paulo are the great woodworking centers. Furniture making in Brazil has now reached the stage where its product can compete with the most particular of world markets. In some of the factories the lumber used is all kiln-dried before working. The workshops are equipped with modern machinery, including American machines for veneering purposes. The artisans work on the hardest and most beautiful of Brazilian woods; they do hand carving and inlaid work with a wonderful degree of excellence. Handsome inlaid trays and table tops may be had at a moderate price containing twenty or more varieties of wood. "Imbuya" is the finest wood for furniture making. It comes in a large variety of colors and grains, is hard but easily worked and after kiln-drying, is almost indestructible.

A number of proprietors and foremen in furniture factories have learned their trade in the Lyceo de Arts e Officios, at Sao Paulo, a school that teaches industrial arts and manufactures various articles. The students work in the shops for three or more years, then leave to become foremen in other factories or do special order work on their own account.

There are more than three hundred varieties of woods in the Sao Paulo region alone and as a whole Brazilian forests not only abound in the finest of woods, but are of enormous extent. Except for a few plateaus, the forests of Brazil stretch from the Atlantic to the heights of the Andes. Transportation facilities are developing slowly and the labor supply is a constant probelm in every Brazilian industry but with its enormous resources Brazil should become one of the world's principal sources of lumber.

RAILROAD TIES IN SOUTH AMERICA

A STRIKING illustration of the depletion of our woodlands and doubtless also of the lack of labor in work on those which remain is contained in a statement by Hermann von Schrenck, of St. Louis, a railroad tie expert, that while oak ties cost $2.00 each in this country, serviceable ties costing only $1.40 each are being imported from South America.



A RAILROAD PLANTATION

A magnificent plantation of white pine growing directly in the limits of a railroad right-of-way is a rare sight, and is somewhat of a surprise to those who suppose that a railroad marks one continuous line of forest fires and devastation. About sixty years ago, the official in charge of the right-of-way of the Greenville branch of the Boston and Maine Railroad, although in these days this branch was a tiny independent railroad, known as the Shirley and Peterboro, apparently because it ran from Ayer, Massachusetts to Greenville, New Hampshire, conceived the idea that a double row of pines on the north side of the track would serve as an efficient snow-break. Acting on this idea, he planted in Townsend, Massachusetts, about three miles of white pines in two rows eight feet apart and eight feet apart in the row. A few sections of this snow-break were apparently burned out, but the greater part is growing today, a fine monument to the foresight and courage of this pioneer railroad man.—H. O. Cook, Chief Forester, Boston, Massachusetts.

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4. Increasing crop yields by planting forest tree windbreaks.

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For like reasons we insist on products with the stamp or trade-mark of responsible manufacturers to assure us the value we pay for.

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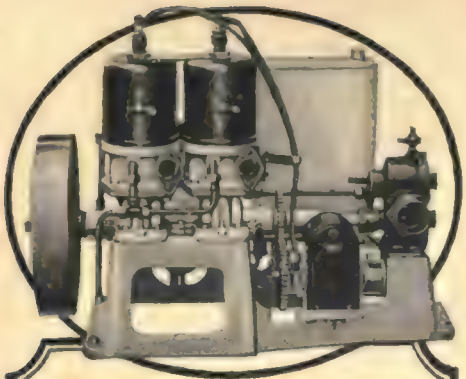
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SEALED bids in duplicate, marked outside "Bid Calimus-Marsh Unit," and addressed to the Superintendent, Klamath Indian School, Klamath Agency, Oregon, will be received until two o'clock P. M., Pacific time, Wednesday, October 27, 1920, for the purchase of the merchantable timber on the tract in Townships 31, 32, 33 and 34, Ranges 8, 9 and 10, Williamette meridian, Klamath Indian Reservation. The said unit includes about 67,000 acres with a total stand of approximately four hundred fifty million feet of timber, principally western yellow pine, of which about fourteen million feet is on about 2,500 acres of allotted land, as to which separate approved contracts with the Indian owners may probably be made. Each bid shall state the price that will be paid per thousand for yellow pine, sugar pine and incense cedar, and for other kinds of timber that will be cut and sealed prior to April 1, 1924. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs for three-year periods. No bid will be accepted for less than $4 00 for yellow pine, sugar pine and incense cedar and $1.60 for other species during the period ending March 31, 1924. Each bid must be accompanied by a certified check on a solvent national bank drawn in favor of the Superintendent of the Klamath Indian School to the amount of $40,000 00. The deposit will be returned to unsuccessful bidders, but retained as liquidated damages if the successful bidder shall not execute contract and furnish satisfactory bond for $50,000 00 within sixty days from the acceptance of his bid. The right is reserved to waive technical defects and to reject any or all bids. For copies of contract and regulations, fuller description of the sale area, and other information, apply to the Superintendent of the Klamath Indian School, Klamath Agency, Oregon.

Washington, D. C., August 10, 1920. CATO SELLS, Commissioner.

PENNSYLVANIA'S STATE FORESTER'S CONFERENCE

ONE of the important features of the reorganization of the Pennsylvania Department of Forestry under the leadership of Gifford Pinchot was a conference at Mont Alto from July 23 to August 6 for all foresters in the employ of the State. The foresters were called together to discuss the various phases of forest activity within the State, particularly those relating to the administration and protection of State forest land, and to formulate policies and procedure for the conduct of the Department's work. The conclusions of the conference will be incorporated in a manual of regulations and instructions for the guidance of State forest officers. In addition to the State foresters there were present, during the course of the conference, representatives of other State departments, the State Forest Commission, the United States Forest Service, and the forestry staff of Pennsylvania State College.

The spirit of the conference was that the Pennsylvania forest problem is a large one and can be met adequately only by earnest and self-sacrificing effort. One of the earliest moves of the new Commissioner had been to secure more adequate compensation for the State forest personnel. In order to do so with the limited funds available the separation of a number of foresters from the service pending more liberal appropriations had been decided upon in a general conference with the foresters, who suggested this course as the wise one to take for the good of the service. The reduction in personnel necessarily resulted in increasing the area of State forest land under the administration and protection of each forester from approximately 25,000 acres to from 50,000 to 70,000 acres.

The Mont Alto conference also decided upon the redistricting of the State into twenty-five units, termed districts, each to be in charge of a forester. The district areas vary from 45,000 to 600,000 acres, depending upon the quantity of State forest land included and the intensity of the problems presented. Under the plan all timberlands within the State are covered by the protective system of the Department.

The Department's policy, with which the Governor is in full sympathy, is to acquire ultimately six million acres of timberland within the State or about one-half of the State's potential timberlands. It is striving also for more liberal appropriations, particularly for fire protection, in order to more effectively meet its responsibilty for protecting the timberlands of the State. Its program is said to be meeting with increased support on the part of timberland owners and citizens of the State in general, who are more and more appreciating the disastrous results which attend forest fires and the need for intelligent management of timberlands.

TIMBER IN NEW ENGLAND

THE output of lumber in the next decade in Maine, Vermont and New Hampshire will be greatly reduced because of the heavy inroads on the timber made by the pulp and paper industry. The paper manufacturers are making an effort to get all available pulp stock before it is necessary to abandon their plants. The result is that much of the timber that would otherwise be cut into lumber has been made into wood pulp. If it were not for the pulp and paper interests, the New England States, says a recent investigator of timber conditions, could keep up their present rate of lumber production for a long period. It is estimated that the production in Maine will shrink a quarter of a billion feet in the next ten years although it had been said that Maine would hold her own from now on. The same situation prevails in a proportionate degree in Vermont and New Hampshire.

The Forest Service has been investigating production, timber stand, etc., in these New England States this spring in preparation for the report required by the Senate under the Capper Resolution.

MIGRATORY BIRDS ON THE INCREASE

A MARKED increase in migratory wild fowl throughout the United States, instead of the alarming decrease which led to steps for their protection, is noted in reports received by the Biological Survey, United States Department of Agriculture, from all parts of the country during the past few months. The change is attributed to the good effects of the migratory-bird treaty.

Friends of the migratory birds believe that the first important step for the perpetuation of the birds has been made, but that another one equally vital remains to be taken. This consists of the conservation and perpetuation of a sufficient number of small inland lakes, as well as island and coastal swamps and marsh areas, to provide the birds places for feeding and resting and rearing their young.

It is absolutely necessary, they point out, that the birds during migration and in winter have proper places in which to live. It is a mistaken idea, they say, that the draniage of almost any area is a benefit to the community. Under proper conditions, "water farming" of many lakes and ponds and of swamp and marsh areas will yield a distinctly larger return than would the same area if drained and used for agriculture. They summarize the productiveness of such farms as follows:

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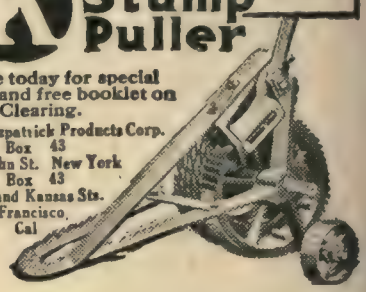
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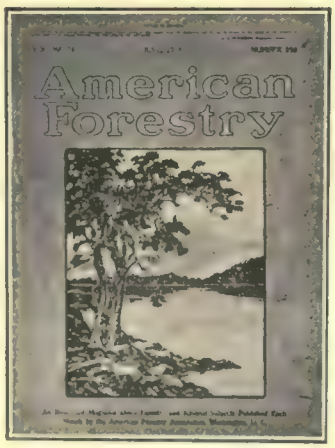
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ST. PAUL PLANTS 4,280 SHADE TREES

THE city of St. Paul, through its Forestry Division, undertook and finished a single job of tree planting this season of 4,280 street trees in one of its new residence districts. This makes a double row of trees 15 miles long. The season was not long and the manipulation of the various phases of the work deserves some mention, as even a thousand trees is considered a large order to plant on streets in most cities.

The trees were dug from the nursery by a tree digging machine and shipped into the city in car load lots, averaging about 430 trees per car. The trees for each car load were dug and loaded in the car and started on its way for the city the sam day. The following day the car load o! trees would arrive in the city and a crew of men supplied with two trucks would start unloading the trees from the car. In one day the car would be emptied and the trees placed in the holes along the streets to be planted. The trees were "heeled in" each one in the hole where it was to be planted.

While the nursery crew and the crew unloading were working, a much larger crew was at work digging holes along the streets to have them ready for the trees. The hole digging crew was always 500 holes ahead of the crew hauling the trees from the cars. Still another crew with ten teams was busy hauling black loam for the tree planting, as each tree was finally planted in one cubic yard of black loam. The planting crew followed the hauling crew and planted the trees which had been "heeled in" in the holes along the streets. By this method a steady "stream" of trees came from the nursery to be planted on the streets and in such a manner that the roots of the trees were always moist. Furthermore the trees were planted with the least amount of handling, as the nursery is supplied with a spur track from the railroad that extends directly in the nursery.

After the trees were set in the holes and properly planted, two men trimmed them with pruning hooks while the crews cleaned up around the trees and mulched them with grass cut off the boulevards.

Plans for tree planting on a job of any size must be drawn by an engineer and the stakes set ahead of the planting crews by a surveyor, in such a way as to miss all sewer connections. The job was finished in one month. The trees were American elms, ten to twelve feet tall and two to two and one-half inches in caliber and cost the property owners less than $5.00 per tree. To date, July 20, there are only 17 dead trees in the whole job.

The work was under the supervison of the City Forester of St. Paul, E. L. Finney, of the Department of Parks, Playgrounds and Public Buildings.

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147,000,000 Feet NATIONAL FOREST TIMBER For Sale

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Stumpage Prices—Lowest rates considered, $4.25 per M feet for western yellow pine, $5.50 per M feet for sugar pine, $1.50 per M feet for white fir and incense cedar, $2.00 per M feet for Douglas fir, and for material unmerchantable under the terms of the contract, to be removed at the option of the purchaser, for which payment is required by the Forest Service, $0.50 per M feet.

Deposit—$10,000.00 must be deposited with each bid to be applied to the purchase price, refunded or retained in part as liquidated damages, according to conditions of sale.

Final Date for Bids—Sealed bids will be received by the District Forester, San Francisco, California, up to and including October 19, 1920. The right to reject any and all bids is reserved. Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, San Francisco, California, or the Forest Supervisor, Sonora, California.

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DOMESTIC EXPORT

(Continued from page 624)

and determined the purposes for which water may be appropriated.

Great waste of valuable waters has always taken place in Texas during the periods of periodical floods of the various rivers. In some parts of the State these floods take place as often as two or three times during the same year, while in others the overflows come only every two or three years. Conservation of this flood flow is one of the expressed duties of the Board of Water Engineers. The policy in the past has been to encourage the people along such flooding rivers to build dams and reservoirs so that the water may be impounded and distributed for use at the time that it is most needed by the farmers. Another step in this conservation was taken when the plans were completed with the United States Geological Survey for co-operative investigation of the water resources of the State which led to a system of stream measurement by gage stations, forty-two of which were in operation by August 31, 1918.

Big irrigation projects are always encouraged by the Board of Water Engineers. Any person or company by depositing a fee of $250 may obtain the priority right to his irrigation project if he can satisfy the Board of Water Engineers that adequate engineering force is available. During the past three years presentments have been filed with the board for projects on the Frio River in Uvalde County, on the Pecos River in Reeves County, and on the Colorado River in Matagorda and the adjoining counties.

One of the big irrigation projects that has been completed within recent years is the Medina River dam system. This is one of the greatest pieces of engineering work in the State. The water is impounded into lakes or reservoirs by three dams. The main dam is 128 feet wide, 1,580 feet long, and 180 feet high from crest to the bottom of the foundations. It is equipped with machinery and appliances for letting the water gradually into the secondary reservoir through discharge pipes five feet in diameter. The lake formed is 152 feet deep at the dam, 16 miles long, 1 and ½ miles wide, and has a shore surface of 93 miles. The distribution of the water takes place through canals and laterals, and the primary purpose of the entire work is irrigation.

Probably the largest irrigation project before the State today is the Big Wichita River irrigation project which is to be constructed in north Texas, where the land to be irrigated is 1000 feet above the sea level. The proponents of the project plan to build a large storage reservoir by constructing a dam across the Big Wichita River about fifty miles above Wichita Falls. A diversion dam is to be built to throw the water into canals on each side of the river. The principal work then will be to construct the storage dam, the diversion dam, and the distributing canals. Th

Big Wichita at certain times during the year is a torrential stream, carrying some silt, and an analysis shows that except at very low stages the water is of very good quality, being practically free from alkali. It has an annual discharge of from 200,000 to 1,000,000 gallons, and the mean rainfall for the vicinity for a number of years is 27 inches. The country to be irrigated surrounds the hustling oil and gas city of Wichita Falls, and irrigation means that the crops of cereals, cotton, and fruits that are now grown will be produced in more abundance and with a greater degree of certainty of success.

Success as it has come to the big irrigation constructions in the last few years is due largely to the Board of Water Engineers, and to it goes the credit for the advancement in this work that has taken place throughout the State. Since the war presentments have been filed for a various number of projects, especially from the lower Rio Grande valley; projects begun before the war are being renewed; in short irrigation instead of decreasing in Texas seems to be entering upon a period of great advancement.

SHADE TREE LAWS

THE man who recently wrote to the Secretary of the New York State Forestry Association at Syracuse, New York, and told him that the authorities in charge of enforcement of the shade tree laws of the State were "saving at the spiggot and losing at the bung" may go on record as the citizen who precipitated the action that led to the needed reform in the matter of shade trees.

An editorial in the August issue of New York Forestry, official journal of the New York State Forestry Association, argues that this so-called bung leakage is not in the barrel of any one organization or State Department; that it is a loss sustained by the whole people of the State, and one which the people themselves must remove by driving in the bung with a brand new shade tree law.

It appears that a land owner residing on any country road may cut down noble oaks, elms and other trees along the highway for cord wood, plow the land to the very edge of the road without interference, and that the law has permitted him to set out saplings in the spring and get 25 cents each in reduction of taxes. Public Service corporations also have certain rights under the law which seem to work to the disadvantage of private citizens seeking to beautify the highway adjoining their property by planting valuable trees.

The State Forestry Association will submit a proposition to its entire membership this fall by letter ballot, with a view to determining whether codification and revision of the State's shade tree laws shall be one of the objectives in the winter campaign for necessary forestry legislation. The Association is appealing for the support of all citizens who are interested.



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BOOK REVIEWS

THE Fungal Diseases of the Common Larch, by W. E. Hiley, 204 pages, published by the Clarendon Press, Oxford, 1919. This treatise attempts to discuss the diseases of the European larch (*Larix Europea*) and their economic importance in terms understandable by the layman, while at the same time including thoroughly scientific descriptions of the characteristics and life history of the fungi described. Nearly a quarter of the entire volume is devoted to a discussion of the larch canker (*Dasyscypha calycina*), which is described as exceedingly common, very destructive, and likely to become even more disastrous in the future than it has in the past. At present the canker is prevalent only in Europe, but it has been reported from Newfoundland so that the danger to America is imminent. The canker works both in dead wood and in the cambium, which it gradually kills until eventually the tree is girdled. Eradication of the canker, which is one of the most virulent diseases of forest trees, is practically impossible. After it has once become established, the maintenance of optimum silvicultural conditions is emphasized as the best means of prevention.

Considerable space is devoted to various heart rots and the honey fungus (*Armillaria mellea*). The latter is characterized as probably the most destructive disease with which British forestry has to contend. It can kill all species of conifers and a great many broadleaf trees, and in many woods is so common that its eradication is wellnigh impossible. The proper silvicultural treatment and particularly the correct choice of site, soil and mixture are recommended as the best preventives for this disease, as well as for the larch canker. In the case of heart rots, frequent sample boring with a Pressler's increment borer are recommended as a means of detecting heart rot in its incipiency, so that the affected trees can be removed before they have been seriously damaged. Leaf diseases are dismissed rather briefly as less harmful than the needle diseases of other conifers on account of the deciduous habit of larch.

The point is brought out that larch is more prone to disease than any other conifer commonly grown in British woods and attention is called to the fact that Douglas fir and Sitka spruce from Western America are now being widely used in situations which would formerly have been occupied by larch. Both trees are faster growing than the larch and good returns may be expected from them on suitable soils, but with neither of them is there such a ready sale for thinnings of all ages as there is with the larch. Japanese larch and western larch are nearly, but not quite, immune from the canker, growing slightly faster than the European larch during their early years, and where grown on a short rotation are safer and at least as remunerative as the latter.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.35
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	2.50
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	2.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.35
LUMBER AND ITS USES—R. S. Kellogg	2.15
FORESTS, WOODS AND TREES IN RELATION TO HYGIENE—By Augustine Henry	5.25
KEY TO THE TREES—Collins and Preston	1.50
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record	1.75
PLANE SURVEYING—John C. Tracy	3.00
FOREST MENSURATION—Henry Solon Graves	4.00
FOREST PRODUCTS—By Nelson Courtlandt Brown	3.85
THE ECONOMICS OF FORESTRY—B. E. Fernow	1.61
FIRST BOOK OF FORESTRY—Filibert Roth	1.10
PRACTICAL FORESTRY—A. S. Fuller	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel B. Green	2.00
TREES IN WINTER—A. S. Blakeslee and C. D. Jarvis	2.00
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume	7.50
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TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst	1.50
TREES—H. Marshall Ward	1.50
OUR NATIONAL PARKS—John Muir	1.91
PRACTICAL FORESTRY—John Gifford	2.50
LOGGING—Ralph C. Bryant	4.00
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott	2.50
FORESTRY IN NEW ENGLAND—Ralph C. Hawley and Austin F. Hawes	3.50
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves	2.00
SHADE TREES IN TOWNS AND CITIES—William Solotaroff	3.00
THE TREE GUIDE—By Julia Ellen Rogers	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary	2.12
FARM FORESTRY—Alfred Akerman	.57
THE THEORY AND PRACTICE OF WORKING PLANS (in forest organization)—A. B. Recknagel	2.10
ELEMENTS OF FORESTRY—F. F. Moon and N. C. Brown	2.50
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THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney	3.00
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THE UNITED STATES FOREST POLICY—By John Ise	5.15
THE KILN DRYING OF LUMBER—By Harry D. Tiemann	4.65

*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

"WAR MEMORIALS," one of a delightful collection of poems by Abigail F. Taylor, is published elsewhere in this issue of AMERICAN FORESTRY. Her book comes from the press of Small, Maynard & Company, Boston, and is called "Verse of Today and Yesterday." It is well named, the poems are full of feeling, inspired by the strongly real.

TIMBER FROM LIVE AND DEAD TREES

PREJUDICE exists in certain quarters against the use of timber cut from dead trees, and some purchase specifications insist that only timber cut from live trees will be acceptable. As a matter of fact when sound dead trees are sawed into lumber, and the weathered or charred outside is cut away, there is no method known to the Forest Products Laboratory by which the lumber can be distinguished from that cut from live trees, except that the lumber from dead trees may be partly seasoned when sawed.

All the information available at the laboratory indicates that timber cut from insect or fire killed trees is just as good for any structural purpose as that cut from live trees of similar quality, providing the wood has not been subsequently injured by decay or further insect attack. If a tree stands on the stump too long after it is killed, the sapwood is likely to become decayed or badly infested by wood-boring insects; and in time the heartwood also will be similarly affected. The same thing is true of logs cut from live trees and not properly cared for. Until the wood becomes affected by these destructive agents, dead tree wood should be just as strong and just as durable as sound live tree wood.

In considering the subject it may be useful to remember that the heartwood of a living tree is entirely dead, and in the sapwood only a comparatively few cells are living. Most of the wood cut from trees is dead, therefore, regardless of whether the tree itself is living or not. Such being the case, purchase specifications, instead of providing that material must not be from dead trees, should state that material showing evidence of decay or insect infestation exceeding a specified limit will not be accepted.

BRITISH IMPERIAL FOREST POLICY

AT the recent British Forestry Conference in London, attended by delegates from all parts of the Empire, it was emphasized that "the foundation of a stable forest policy for the Empire and for its component parts must be the collection, coordination and dissemination of facts as to the existing state of the forests and the current and prospective demands on them. To this end it is of the first importance that a systematic survey be undertaken in each part of the Empire which will not only serve as the basis of the forest policy in that part, but also provide a means for reviewing the forestry position of the Empire as a whole."

The destruction of forests in the United Kingdom during the war for military purposes, says the United States Consul at London in Daily Commerce Reports, and the dependence upon overseas supplies have led to extensive reforestation plans and given stimulus to governmental action toward securing a scientific forest policy based on the economic principles of annual cutting of surplus timber as a crop and provision for automatic reproduction, as well as the reforestation of large unused areas.

It is urged that each of the governments of the Empire should lay down a definite forest policy to be administered by a properly constituted and adequate forest service, and a central Forestry Bureau in London is recommended for study, research and reference.

FOREST RESEARCH

A COMPLETE summary of all of the scientific investigations upon forest problems which are now under way in the United States and in Canada has recently been published as a bulletin upon "North American Forest Research" by the National Research Council, Washington, D. C.

In this bulletin 519 different projects for investigation are described including the reforestation of cut-over areas, the replacement of timber cuttings by natural growth, the control of insect pests and fungus diseases of forest trees, beneficial modifications of lumbering practice, the preservation of timber in use, the utilization of by-products and the relation of forestry to rainfall, control of flood waters, grazing, etc.

The importance of the most penetrating study upon the conservation of our remaining forest resources is brought home by the recent announcement of the Forest Service that "three-fifths of the original timber of the United States is gone and that we are using timber four times as fast as we are growing it." Our annual consumption of lumber alone is over 300 board feet per capita, and of newsprint is 33 pounds per capita. Cut and burned over forest lands in the United States, now waste territory, equal in area the whole of the present standing forests of Denmark, Germany, Holland, Belgium, France, Switzerland, Spain and Portugal. The total population of these countries is about 152,200,000, nearly 50 per cent greater than the population of the United States.

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AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

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WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

DISCHARGED SAILOR would like position as assistant forester or a permanent position as surveyor with some lumber company with a chance for advancement. Salary is of secondary consideration. Married, so would have to locate in some small town. Have had four years' practical experience in general forestry, and some tree surgery. Address Box 900, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C.

SUPERINTENDENT retail lumber and building material establishment desires connection with progressive lumber concern in locality where there is opportunity for growth. West, Southwest or Middle West preferred, but not essential. Several years experience retail and manufacturing, also eighteen months overseas with Forestry Engineers. Available after August 15th. Address Box 930, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C. (8-10-20)

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POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 800, Care American Forestry Magazine, Washington, D. C.

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C.

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

Nominate Your Friends for

MEMBERSHIP

in the

American Forestry

Association

POSITIONS OPEN

"CIVIL ENGINEER TO SURVEY AND MAKE DETAIL MAPS, ABOUT 2,000 ACRES, NEAR NORWICH, CONNECTICUT. EXCELLENT BOARD AND LODGING. STATE TIME AND TERMS. Address Box 940, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C.

WANTED—Two technically trained foresters. One as Assistant Forester for technical work with headquarters at Trenton, New Jersey, and one as Division Firewarden with headquarters in northern part of State. Firewarden to own and operate automobile for which liberal mileage charge is paid. Salary to start $1,500 and field expenses. If unwilling to apply at this figure submit applications stating minimum salary. Address Department of Conservation and Development, C. P. Wilber, State Firewarden, State House, Trenton, New Jersey.

MAN WANTED with technical training and practical experience sufficient to make him thoroughly competent as a developer of Park plans, and also Park Superintendent—both in road construction, planting and landscape work—and Director of Forestry Service upon the public streets and parks of the city. Address Box 910, American Forestry Magazine, Washington, D. C. (6-9-20)

WANTED—An assistant forester. Good place offered for a recent graduate who would like to get in business for himself in an excellent location. Address Box 920, AMERICAN FORESTRY MAGAZINE. (8-10/20)

PLANT MEMORIAL TREES

HELP WANTED—A large Pulp and Paper Company Requires men for its forestry operation and surveying in the Province of Quebec. Men having technical training or bush experience, or both, are preferable, but any that are physically fit and willing to persevere and rough it will be carefully considered. Apply Box 960, American Forestry Magazine.

EQUIPPED WITH NOISELESS TYPEWRITERS

WHEN the American Forestry Association was compelled by a fire to vacate its eight offices in the Maryland Building, Washington, D. C., the only quarters obtainable was a very large room housing the whole Association. The twenty-five typewriters required to do its work made such a persistent clatter that the editorial and publicity departments were seriously inconvenienced. These typewriters were disposed of and Noiseless Typewriters secured, the noise thus eliminated and all the departments enabled to work comfortably and quietly together in one room.

FORESTRY EDUCATION

THE British Empire Forestry Conference, which met in London during July adopted the following resolutions on forestry education, which the delegates are to bring to the notice of their respective governments:

It should be a primary duty of forest authorities throughout the Empire to establish systematic schemes of forest education. It has been found, for climatic and other reasons, that it would not be possible to reach part of the Empire to establish a complete scheme of forestry education of its own, and therefore, it is essential that those parts of the Empire which are willing and able to establish complete systems should, as far as possible, frame such schemes with a view to combining for meeting the needs of those parts which can only themselves make a partial provision for their requirements.

IDAHO SCHOOL OF FORESTRY

THE School of Forestry, University of Idaho at Moscow is announcing the 1920-21 session of its Ranger Course, to open November 1 and close March 21. The work is for forest rangers and guards wishing to prepare themselves for more rapid advancement; for young men planning to enter the ranger service; also for men in logging camps and sawmills, or connected with any other phase of the timber industry, who wish to increase their efficiency, but who cannot spare the time for a fuller course.

The work is of high school grade and admission is without examination. The course, which is thoroughly practical, prepares for the civil service examination for the position of forest ranger. Experts from the United States Forest Service will assist in giving the instruction.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

WASHINGTON, D. C.

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CHANGE OF ADDRESS

A request for change of address must reach us at least thirty days before the date of the issue with which it is to take effect. Be sure to give your old address as well as the new one.

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AUTUMN

(An Indian Fragment)

BY MARY ADELAIDE McTIGHE

WITH stately, solemn tread, and silent, moccasined feet---across the mountains, and down the sloping hills, through many a valley and winding defile, comes the Great Chief Autumn, to visit the land where dwelt his forefathers of yore.



Gorgeous in warpaint; and scarlet and yellow dyed feathers and quills, with the scalps of numberless flower victims.

At his threatening aspect the timid plants grow pale, and shrink with fear.

Suddenly appearing in the open, he hesitates, as if to gather his forces for a fierce onslaught; then, with a savage war whoop, he hurls back at the still unconquered trees the keen edged hatchet of his wind; and reluctantly, they drop their leaves, in token of surrender and defeat. But he, indifferent --unconcerned--stalks along, in all the pride and arrogance of his race.

Gazing over the land where his fathers hunted and fished before the coming of the hated Pale Face, who tricked him and robbed him of his own, his heart burns with a fierce desire for revenge, and he plans it well.

Lurking behind underbrush and boulder, hiding in ambush through many a warm, sunny day; resting, and patiently waiting his chance,---deceiving his enemies into the belief that he is still far away, he stoops low and creeps stealthily on; now, bounding like a deer from rock to rock, he wakes the Fire Serpent, that slumbers mid the dead mosses and leaves, and starts him on a path of destruction across the wooded slopes.

Darkness reveals the devouring monster crawling and wriggling his way, like some huge Glow Worm on the mountain heights, that leaves a scorched and blackened trail wherever he has passed, tarnishing the morning sun with his murky breath.

Glutted with revenge, seeing the devastation he has wrought ---spent with weariness and fatigue, Autumn, pillowed on the rounded hills, stretches his gaunt form to rest.

There, sleeping under the quiet stars, his ever-pursuing foe, Frost-in-the-Night, comes suddenly upon him and treacherously pierces him to the heart

For many days, borne on the wings of the wind from the farthest west, comes the moaning and the wailing of the Squaws: and the bending Pines wave their dark funereal plumes where the Great Chief lies, stark and dead.



AMERICAN FORESTRY

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EDITORIAL

ANOTHER ORGANIZATION TO PREVENT FOREST FIRES

ON the same day that the council of wood-using industries was being organized in Chicago, representatives of state forest organizations, the Forest Service, private forestry associations, and educational institutions was held at Albany to discuss ways and means of furthering a forest program for the Nation. The final outcome of the conference was the organization of a National Committee for Forest Fire Prevention. Mr. George D. Pratt, Conservation Commissioner, New York State, was made chairman, and Mr. Harris A. Reynolds, secretary of the Massachusetts Forestry Association, secretary. These officers, together with Colonel H. S. Graves, formerly Chief of the Forest Service; Mr. J. E. Rhodes, secretary of the Southern Pine Association, and Mr. W. T. Cox, State Forester of Minnesota, constitute the executive committee, which is clothed with rather broad authority to take such action as its judgment warrants. It was the sentiment of the meeting that this committee should organize with representatives from the various states in order to take common counsel and to bring pressure to bear for the enactment of both Federal and State legislation along the lines of fire protection.

The formation of this new committee is of particular significance because it offers a common meeting ground for those interested in the adoption of a national forest program who do not readily fit into any of the other organizations already in existence. The Forest Service, Society of American Foresters, National Lumber Manufacturers' Association, American Paper and Pulp Association, and the Council of Wood-using Industries, are each composed of individuals having a common interest which is not necessarily the same as that of another group. Quite outside of these groups is a large part of the general public which is vitally interested in the perpetuation of our forests but which at present has no affiliations. The new National Committee for Forest Fire Prevention may perform a useful function by serving as a rallying ground for these and affording them an opportunity to make their views known.

The one unfortunate feature of the new organization seems to AMERICAN FORESTRY to be the self-imposed limitation of its scope to forest fire prevention. No one disputes the importance of this. Adequate fire protection is the first essential and an absolute prerequisite for other measures. There are, however, other phases of the forest problem that cannot be ignored. There are, for example, considerable areas now forested on which natural reproduction will not take place following cutting unless an adequate number of properly distributed seed trees are left. These areas must be handled under the methods of forest management found most effective for the particular type of forest in question. There are other large areas of forest land already denuded and needing planting. If the forest and wood-using industries in specific localities are to be maintained, steps must be taken to regulate the cutting of the forests so as to insure a continuous supply of timber. All of these are integral parts of any really comprehensive forest program. It is to be hoped that this new National Committee will see its way clear in the near future to enlarge its present scope so as to include at least the all-important subject of silviculture.

A COUNCIL OF WOOD-USING INDUSTRIES

THE movement inaugurated by the conference of wood-using industries at Madison, Wisconsin, last July is now taking definite shape and gives every promise of playing an important part in shaping the forest policy of the country. On September 28 the steering committee appointed by this conference arranged for a meeting at Chicago which resulted in the organization of a Council of Wood-using Industries. This is in a way a super-organization embracing the sixty odd associations of furniture, veneer, and vehicle manufacturers, wood turners, wood preservers and numerous other wood-users already in existence. In some respects it can be looked upon as performing approximately the same function for consumers of forest products as the National Lumber Manufacturers' Association does for producers. The newly formed council at its Chicago meeting adopted a constitution, elected Mr. Edward E. Parsonage, president of the John Deere Implement Works, as president, and outlined the general scope of its activities.

The wood-users have two primary objects in view in the step which they are taking. These are, to perpetuate the forests of the country through fire protection, reforestation, and improved methods of forest management, and to promote the more efficient and economical use of forest products. Both objects are worthy of the heartiest support from all those interested in forest conservation.

If this country is to continue to meet its own needs for wood and other forest products, it must keep its forest lands productive and must make the material produced go as far as possible. That important results of immediate application can be secured in the latter field has been demonstrated by the ten years of research conducted by the Forest Products Laboratory at Madison. Recent investigations by the wood turners have also indicated the possibility of effecting amazingly large savings by standardization of specifications, the more careful saving of dimension stock, and similar measures. Increased forest production is equally essential, however, and it is greatly to the credit of those who utilize but who as a rule do not grow the wood, that they should recognize this fact.

That the movement for the practice of forestry now under way in this country will receive a decided impetus from the organization of the council of wood-using industries cannot be doubted. These industries represent an investment of hundreds of millions of dollars and form the backbone of many communities throughout the country. Many of their leaders are leaders also in the business world and any recommendations that they may make will carry considerable weight. It is therefore a hopeful portent that these industries through their newly organized council are planning to study the various suggestions already made regarding the adoption of a forest program for the country with a view to reaching conclusions which they can support and which they will endeavor to have enacted into law. AMERICAN FORESTRY congratulates them on their foresight and public spirit, and wishes them all success in the work they have undertaken.

A GOOD MOVE

DURING the summer a conference was held at the Forest Products Laboratory at Madison, Wisconsin, which bids fair to result in bringing closer together those interested in forest production and in wood utilization. Its primary object was to discuss the training of specialists in forest products along lines which, in addition to furnishing a fundamental education in engineering or the physical sciences, would include enough forestry to give them the forester's point of view and to enable them to connect their specialty with the growing forest. The conference expressed its approval of a combination course of this sort and appointed a committee to work out the details and to report with recommendations to be a proposed general conference on forest education to be held early next winter. Much good should come of the movement which has thus been started. There is no doubt that men engaged in forest products work, whether in research or in industry, will be better equipped for their task if they have a real understanding of forest production and the place of forestry in the life in the nation. There is equally little doubt that those whose primary care is the growing, management and utilization of forests will gain from the closer contact with their fellow workers in the field of forest products that will inevitably follow when the latter are trained in forestry as well as in engineering or chemistry. Increased forest production and increased efficiency in the ulitization of forest products are but two, and equally important, phases of forest conservation. Any movement that emphasizes this fact and that serves to bring about a closer co-operation between workers in the two fields is worthy of all support.

IN BEHALF OF FOREST EXPERIMENT STATIONS

THE Arizona Wool Growers' Association and the Arizona Cattle Growers' Association at a joint meeting in Flagstaff last summer passed a resolution favoring the abolition of the Fort Valley Experiment Station on the ground that its work "has been an entire failure and a useless expense to the amount of approximately $20,000 per annum." The resolution was adopted without discussion, and subsequent developments have indicated that many of those at the meeting did not appreciate its significance and had no desire to interfere with the investigative work of the Forest Service. Fortunately no harm seems likely to come of the incident. It does, however, call attention to an unfortunate condition, namely, the widespread lack of knowledge of the activities of the forest experiment stations and consequent failure to appreciate their true value.

The Fort Valley Experiment Station has been in existence for more than twelve years. During this time, as a result of carefully planned and systematically conducted investigations, it has demonstrated that by proper methods of cutting and protection reproduction of western yellow pine, by far the most important species in the Southwest, can be obtained and costly artificial reforestation avoided. It has also shown that planting, which for many years met with complete failure, can be successfully conducted in accordance with methods developed by the station on denuded areas where natural reproduction would be wholly out of the question for many decades, or perhaps even centuries. It has secured much information regarding the relation between forests and their environment which will be of great value in the development of improved methods of forest management. In short, its activities have yielded results of immediate practical use in the face of exceptionally adverse conditions.

It is safe to say that the cattle and sheep men at the Flagstaff convention to whom these facts were known could readily be counted on the fingers of one hand.

Doubtless the resolution advocating the abolition of the station was not adopted because of any desire to injure a valuable line of Forest Service work but because of unfamiliarity with this work. Unfortunately the cattle and sheep men are not the only ones in this position. The majority of lumbermen and timberland owners are probably equally ignorant of the work of the Fort Valley and other experiment stations. It would not be surprising if a considerable proportion of the general public never heard of forest experiment stations and have no conception of their place in the perpetuation of our forest resources. Even to Congress the stations are largely an unknown quantity, and this ignorance of their activities and value doubtless played an important part in the reduction for the present fiscal year of the appropriation for the maintenance of such stations.

As a matter of fact, forest experiment stations must be depended on to furnish the fundamental facts on which to base the management of the forests of the country. They are comparable to agricultural experiment stations, the value of which is universally recognized, but are if anything even more essential since they deal with a long-lived crop which can be thoroughly studied only by carefully organized investigations covering a considerable period of years. If any of the various forest programs now being agitated are to be made really effective, the measures which they propose must be based on results secured in large part at adequately manned and equipped forest experiment stations. AMERICAN FORESTRY would like to see such stations established at the earliest possible opportunity in every one of the principal forest regions in the country.

Every timberland owner, every lumberman, and every other user of forests and forest products is more or less intimately affected by the way in which our forest resources are handled and should consequently be interested in the adequate development of those agencies which will make our forest management as effective as possible. There is therefore a real reason why they should become familiar with the work which the forest experiment stations are now doing and give their support to the extension of this work to the entire country. In this case it is safe to say that familiarity will breed, not contempt, but a lively interest in and appreciation of the past accomplishments and future possibilities of the stations. Close co-operation between the stations and those benefiting from the results of their work will prove of benefit to both, and AMERICAN FORESTRY hopes that such co-operation will be much more general in the future than it has been in the past. That it will be a paying investment for all concerned there can be no doubt.

BRITISH IMPERIAL FORESTRY CONFERENCE

THE British Empire Forestry Conference held in London last summer constituted a notable event for foresters and others interested in forest conservation throughout the world. That such a conference should have been called in a country which has hitherto been notoriously indifferent to its forest resources is in itself a significant fact. Added significance is given by the cosmopolitan character of the attendance, which was made up of thirty-five delegates from all parts of the empire. These will carry home with them new ideas and new inspiration for the work which lies ahead. Their deliberations and conclusions should also result in a decided stimulus to the forestry movement in other countries as well as in the British Empire.

The resolutions adopted by the conference were remarkably comprehensive and farsighted. Each of the governments included in the Empire was urged to lay down a definite forest policy to be administered by a properly constituted and adequate forest service. This policy should aim at securing a sustained yield from all classes of timber, encouraging the most economical utilization of wood and other forest products, and maintaining and improving climatic conditions in the interests of agriculture and water supply. A high standard is thus set which it will be difficult for any government or individual administration to ignore.

The Imperial Forestry Conference proved conclusively the advantages to be derived from an inter-change of ideas by the responsible forest officers and others interested in forestry throughout the far-flung British Em-

relations between the various parts of the empire. Is there any reason why similar but more far-reaching repire. It will undoubtedly result in a clearer recognition of the problems involved, in a more aggressive attempt to solve them, and in the establishment of closer commercial sults could not be obtained through a still more inclusive world conference? Surely Canada is fully as interested from an economic standpoint in the forests and forest policy of the United States and Argentina as in those of Nigeria or New Zealand. With the steadily increasing depletion of the timber supplies of the world each country is becoming more interested in the forest resources of its neighbors, both near and far, and in the development of trade relations. The United States now imports spruce from Canada and oak from Japan; Brazil imports longleaf pine from the United States; Great Britain imports mahogany from Mexico; China imports teak from India, and so it goes. Each country is becoming more and more dependent on some other country to meet some particular need, and as a result the forest problem is becoming less local and more international in character. Why then would not a world conference for the discussion of forestry questions of mutual interest be well worth while?

The next meeting of the British Empire Forestry Conference is to be held in Canada in 1923. American Forestry would like to see this followed by a world forestry conference which the United States would take the lead in arranging. It is none too early to begin to consider ways and means of holding such a conference, the ground to be covered, and the objects to be achieved.

LARGE TREES FOR MEMORIAL PLANTING

When the Arlington Amphitheatre was dedicated the public found placed about the memorial full grown trees. This work had been done by Lewis and Valentine, Landscape Engineers, of Philadelphia. In the laying out of grounds for such structures or for country estates or in any project in which landscaping is a major part of the scheme you do not have to wait for trees to grow. The art of transplanting full grown trees to meet the landscape artist's ideas has become a science in itself.



Underwood & Underwood.

TRANSPORTING ANCIENT BOXWOOD TREES TO THE LINCOLN MEMORIAL



National Photo Company.

READY FOR PLANTING AT THE LINCOLN MEMORIAL

In the case of the Lincoln Memorial, old trees from the grounds of Charles H. Heitmuller were moved to their places designated by the landscape architects. The trees formed a part of the Union line of defense about Washington during the Civil War and were moved five miles to the Lincoln Memorial in Potomac Park. The Lincoln Memorial is opposite the Lee Mansion in Arlington Cemetery across the Potomac.



Commercial Photo Company.

THE ARLINGTON MEMORIAL AMPHITHEATRE

VALLOMBROSA FOREST IN ITALY

BY NELSON COURTLANDT BROWN

(PHOTOGRAPHS BY THE AUTHOR)

NEARLY everyone interested in forestry who spends any time in sunny Italy, pays a visit to the State Forests which are scattered in small patches throughout the rugged peninsula. Perhaps the most frequently visited of these forests, on account of its relative accessibility as well as its interesting historical associations and the welcome, cool shade in the warm summers, is the Forest of Vallombrosa. It is as well known and appreciated among European travelers as the well known Forest of Sihlwald, near Zurich in Switzerland, the Forest of Fontainebleau southeast of Paris or the Forest of Nottingham in England.

The Forests of Vallombrosa are within easy reach by motor-car or by train and funicular from Florence in the heart of Tuscany. By motor, it is just 34 miles from Florence and lies over three thousand feet in elevation along the upper reaches of the Apennies, overlooking the broad sweeping valley of the Arno. Not far from Vallombrosa is the crest of the divide with the turning of the waters between the Adriatic to the east and the Mediterranean to the west.

Vallombrosa, within recent years, has become a favorite and well known summer retreat, and for a long time it has been favored in song and story, especially by Milton and Dante who walked its shadowy paths centuries ago. Now, every summer it is the vacation ground for many of the Italian nobility and for the diplomatic corps at Rome. Its great attractiveness lies in the dark, cool silver fir forests with their many highways and woodland walks and the fascinating scenery. There is a great contrast in climate between Vallombrosa lying high in the mountains and the hot dusty valleys during the three warm summer months. In this part of Italy, silver fir grows only at the high elevations. Along the lower slopes are the symmetrically laid-out olive groves, the carefully tended vineyards and the scattered fig and cypress trees, the latter especially to be remembered as associated with every attractive view of the Tuscan landscape—a pleasant and unforgettable part of every visitor's impressions. Between the olive groves and the forests along the upper slopes are the chestnut groves, of which there is a greater percentage in Tuscany than in any other province in Italy.



MONASTERY OF VALLOMBROSA

The old watch tower and guard house at the Monastery of Vallombrosa. Here students of the National Forest School were placed in punishment for breaking school rules.

It is said that every American tourist who includes Italy in a European itinerary visits Rome, and next to Rome, he is attracted to Florence and its charming environs. From Florence, the Forests of Vallombrosa appear like a dark green blanket on the mountain crests to the east, and from the forest itself one can readily descry, on a fair day, the city surrounded by its villas and cypress-clad hills and the characteristic towers of its ancient cathedrals and palaces.

Conditions surrounding the Italian State forests are comparable to those about our own National Forests. That is, most of them are very irregular patches of forests, some are exceedingly remote from the large communities and transportation facilities, and the forest cover is often in a poor condition. By way of comparison with our extensive National Forests in this country, a much smaller percentage of the Italian forests are owned and managed by the Governmental authorities. Extensive plans, however, are under way for further regulation of forests now in the hands of private interests, much of which is not being managed according to modern scientific principles of forestry.

The historical associations connected with the Forest of Vallombrosa are very interesting. It was founded in the twelfth century and given its name which, literally translated, means "Shadowed Valley," by Saint Giovanni Gualberto. It was founded as a monastery and retreat for one of the Benedictine order of Monks, and from its early inception, the monk took great pride in caring for, cultivating and replanting the forests. Both the monastery itself and the forests became enlarged from time to

time. The interior courtyard, the bell tower and the watch tower are the oldest sections, while the facade, which the visitor first sees on approaching the monastery was not founded until the sixteenth century. It was used continuously as a monastery until the year 1861, and the colony consisted of about fifty monks. Even at the present time there are two monks associated with



ITALIAN FORESTER'S HOME

A cottage home of a forester in the valley of the Casentino, made famous by Milton, Dante, Keats and St. Francis of Assisi. In the background is the well-known Castle of Pioppi, where one of the robber barons held sway during the Middle Ages. This is in the valley east of the forests of Vallombrosa.

the monastery during the summer time and one during the winter. In 1869, the monastery was converted into the Royal Forestry College, which continued at Vallombrosa until the year 1911 when the school was moved to the Cascine Gardens on the outskirts of Florence. One of the most interesting features of the monastery is the old type of kitchen used in the Middle Ages. It consisted of a raised fireplace in the middle of the room around which the monks sat and prepared their meals, the smoke going up through an aperture in the center of the room. It is said that the kitchen was the only really warm room in the whole monastery, and during the winter it was consequently used not only for a kitchen but for general purposes as well since there was ample room to sit all about the fire which was maintained in the center. The old monks' cells were converted into dormitories for the faculty and students of the forestry college, and even at the present time, visitors are entertained in the old cells of the Benedictine monastery. Special cells are now reserved for the annual visits of the Minister of Agriculture, the Director General of Forestry, their staff, etc.

It is a quaint and interesting old place, situated in a deep silver fir-clad gap in the high mountains about Vallombrosa. Although the forestry college was moved to Florence in 1911, it is still the summer headquarters for this school, that is, from June 1 to July 15 and from September 15 to October 15, when the professional students are given a portion of their field training and it also serves as the location of one of the State supported ranger schools. Before the war, there were 150 students in the ranger school at Vallombrosa, which consists of a one-year course. Most of these students spend three years as forest guards before going to the ranger school at Vallombrosa for final training.

Before serving as forest guards, they spend one year at the ranger school at Citta Ducali in the Abruzzi, near Apulia. On the successful completion of the ranger course at Vallombrosa a degree of brigadier is given them, whereas a few of the very best men are given the title of marshall. On completion of the ranger course at Vallombrosa, the men as brigadiers get 1800 lire, which normally is equivalent to about $360, whereas the marshals receive 2400 lire, equivalent to $480. While the



AN ITALIAN REBECCA

An Italian water carrier with her copper vessels and fiascos at a wayside spring. This was taken at a village along the high mountain divide in Tuscany.

students are at Vallombrosa, they receive two lire extra or about forty cents per day. The professional course students from Florence are always kept separate from the ranger students while at Vallombrosa.

Every visitor to the Forests of Vallombrosa is shown by the local forest officials the shrine of Saint Giovanni Gualberto in the deep fir woods above the monastery, and the story is related of an old legend which tradition has handed down from the past nine centuries. It is said that this sainted monk acquired a great reputation for miracles in healing the sick, etc., and during the course of one of his meditations at his lonely hermitage in the forest he was suddenly confronted by the devil himself. A bitter fight ensued in which the devil was very badly worsted and eventually tossed down a rocky

gorge. An attractive shrine was later erected at this place in commemoration of the saint, and to this day a tablet marks the spot of the bitter struggle. Farther up the gorge above the monastery, an old hermitage was converted during the war into a retreat for orphan children of the war and for children of soldiers serving at the front. These children were brought by the hundreds from the congested cities of the lower valleys. The expenses were met by a fund subscribed by Italians and English as well as by Americans.

The forest itself, the official name of which is "Foreste Demaniale de Vallombrosa" consists of an area of 3500 acres and reaches its highest point at a place called Secchiate at an elevation of 3500 feet. Of this area only 875 acres are of chestnut, 125 acres of three varieties of Italian pines (*Pinus Sylvestris, P. Austriaca* or *Nigricans* and *P. laricio*). The remainder of the forest consists of European beech (*Fagus sylvatica*) and silver fir (*Abies*



THE PONTE VECCHIA IN FLORENCE

The famous Arno flowing through the heart of the city of Florence in Tuscany. Florence is the starting point for a visit to the forests of Vallombrosa and this river has its head waters along the crest of the Appenine Divide near Vallombrosa. In the foreground is the well-known old Ponte Vecchia.

pectinata). This forest has been under continuous forest management by Italian forestry officials since 1869, and for centuries before that date the monks carefully protected, cultivated and cared for the forest. Much of the timber was mature, having been planted by the monks from ninety to one hundred and twenty years ago and was ready to be cut to meet the great emergency arising out of the Italian war program. With the abnormally large imports of lumber cut off owing to the lack of ships, the native Italian forests were largely resorted to to meet this great emergency and the splendid forest of Vallombrosa, held almost sacred in the hearts of many Italians, was sacrificed very largely for this purpose.

The forestry officials have determined that the so-called financial maturity or the age at which trees can be cut to best advantage measured in terms of profit as well as for the best interest of the forest itself are as follows. The silver fir is considered mature at from 90 to 100 years of age, the beech at 120 years and the chestnut at 34 and 51 years of age. No pine in this forest is over 40 years of age, it having been planted about the year 1878, and was cut for war purposes as the timber



SIXTEENTH CENTURY MONASTERY

The Monastery at Vallombrosa built in the Sixteenth Century as a retreat for the Benedictine Monks. From 1870 to 1912, it was used as the home of the Royal Italian Forestry College. It is now the headquarters of the Vallombrosa Forest, as well as one of the State Ranger Schools.

was badly needed and the areas are being replanted at once with silver fir, which has been shown to be the best tree for forest management.

The purpose of management of this forest is not only to supply timber, but to maintain the forest as more or less of a summer resort and vacation retreat for those throughout the Italian peninsula. Even where cuttings were made to serve the war emergency, strips were left along the highways and woodland paths so that the impression of devastation and desolation which is so often associated with logged off forests is not present.

At the above maturities, the product of the various kinds of trees was as follows:

The average production of silver fir was 240 cubic meters per acre, whereas the maximum stands ran up to 440 cubic meters per acre. Beech produced 140 as an average, of which one-half was used as fire wood and a maximum of 200 cubic meters per acre. The average pine at 40 years produced 100 cubic meters per acre and a maximum of 140 cubic meters per acre. The chestnut production at 17 years was about 52 cubic meters per acre, at 34 years, about 104 meters, and at 51 years, some 156 meters per acre.

Chestnut trees are chiefly cut at an age of 17 and 34 years because if left to grow to an age of 51 years the

added growth is not justified. It is consequently cut chiefly for vineyard stakes, small poles, etc.

The trees per acre at maturity, are: Silver fir, 160, at an age of 100 years; beech, 160, at an age of 120 years, and pine, 320 to 350 at an age of 40 years. When these forests were planted 1,750 plants were used per acre for silver fir, whereas of the pine about 100 plants per acre were used.



MONASTERY OF VALLOMBROSA

A general view over the Monastery of Vallombrosa, Italy, the forest garden in the background and the hotels on the right. This view was taken from far up the so-called "shadowed valley" on a cliff overlooking the group of buildings.

Before the war, the system very commonly adopted in forest management in Italy was as follows. The silver fir forest being intolerant of shade and even aged was clear cut, that is, all trees were cut off clean and planting followed immediately. With the beech, however, the selection system was followed, that is, individually, trees here and there were removed from the forest as they became mature. The pine was also intended to be cut clean and replanted at once. All of the species are grown in pure stands, that is the fir, beech, chestnut and pine were never mixed together in the same stand. This was done, according to the Italian foresters, because it was believed that the quality of the wood was distinctly inferior when grown in mixed forests. That is the claim made by many eminent Austrian foresters, and prominent Italian lumbermen who have held and operated extensive holdings in Austrian forests are of the same opinion.

The annual normal cut from the Vallombrosa forests was for silver fir, 2000 cubic meters; beech, 2000 cubic meters; chestnut, 1700 to 2000 cubic meters.

In case of the pine, it had not attained sufficient size to produce an annual yield. The net return from silver fir was roughly $4.00 per acre per annum. From the beech, very little was obtained—only about 80 cents being derived per acre per annum from these forests. The very careful working plan or scheme of management has been devised for these forests by Professor Guiseppe Di Tella. It has been closely followed and it is generally agreed that it has been a great success.

Near the old monastery there is one of the most extensive and complete forest aboreta in the world, which is a very interesting and attractive feature of the forests. This was established forty or forty-five years ago so that experimentation in the growth of trees from all over the world has given definite results. It has been demonstrated that under these conditions of climate, soils, etc., over three thousand tree species from all over the world can be propagated successfully. There are a large number of American trees which have reached an excellent size in this time, particularly Douglas fir, white pine, redwood, yellow poplar, concolor fir and Lawson cypress. The Douglas fir is easily the most successful of those planted, among the American trees, but considerable quantities of the Lawson cypress and concolor fir have also been adopted for commercial planting.

California redwoods are commonly found planted in every section of Italy, and they seem to develop splendidly under the conditions of the Italian climate. In Bologna recently a redwood tree over four feet in diameter was cut which had been planted only about sixty years ago. Sections of this tree are now exhibited in the Museum of the Royal Forestry College at Florence.

The heavy cuttings in the Vallombrosa Forests are representative of the condition which prevailed in all of the forests throughout Italy, including not only the State forests but those belonging to the municipalities and private interests as well. To meet the great need for lumber and



MONK CELLS AT VALLOMBROSA

Looking up the highway along the old Monastery at Vallombrosa with its interesting old monk's cells, its decorative lamp posts and the old watch tower in the background

timber of all kinds for the great army of 5,000,000 men at the front, nearly all of the available and mature timber was taken. The famous Forest of Vallombrosa was not spared in this respect. Instead of a normal annual cut of 6000 cubic meters before the war, during the year 1917 and before the end of the year 1918, 30,000 cubic meters of silver fir were cut, 18,000 of beech, 6,000 chestnut and 1,000 pine, making a total of 55,000 cubic meters, which is equivalent to over nine years' normal production in this forest. That is, the future yield for approximately nine years was discounted for the present war emergency, and aside from this the growth to be expected during that time was cut off, so it is estimated by the Italian officials that for probably fifteen years at least no cutting can be made in the Vallombrosa forest.

All of the best silver fir forests, that is, not only those which were actually mature, but those which were approaching maturity were cut off and the material rushed to the front, the silver fir lumber being in especial demand for troop barracks, trench timber and boxes and crating stock for munitions and food supplies. The immature pine as mentioned above was also sacrificed as well as a good share of the better beech, only a small portion of which has reached maturity.

Lumbering in a primitive way had been practiced on the Vallombrosa forests by the monks during the past several centuries. A sawmill had been erected by them, but on account of the distance from the railway, this forest had not supplied an important quantity of lumber, the principal products having been charcoal. vineyard stakes, fuel wood and lumber used locally.

During the war, however, in order to log the trees in a most economical manner, log chutes were erected, and in the steep gulches an overhead cable system similar to those used on the high mountain front by the troops was installed for the larger logs in two of the principal valleys.



IN THE HEART OF A FOREST

A colony of children being entertained at a little woodland home in the heart of the forest of Vallombrosa. These children were from Florence and Pontassieve and remained for several weeks during the summer of 1918 The fathers of most of them were soldiers in the Italian army.



FORESTERS IN ITALY

A group in the summer garden at Vallombrosa. In the foreground is the Signor Bonomini, manager for the lumber company cutting Vallombrosa forests, on the extreme left Professor Di Tella; standing above on left, the director of the ranger school, standing in the center, state inspector, and on the right Signor Camillo Parisini, general manager of the Fratelli Feltrenelli Company of Milan In the right foreground is Signor Martinetti of Florence.

Aside from these means, oxen were used to bring the logs into the sawmill which was centrally located for the woods operations, just below the old monastery. The average length of haul for these logs was one mile. The logs were usually cut in lengths of four meters or about 13.1 feet. The fir was also cut in lengths of five and six meters whereas the beech was usually cut in two and three meter lengths as well as four meters. When the silver fir and pine logs were to be used for beams and general construction work they were cut in 7, 8 and 10 meter lengths. In all cases, 10 centimeters was allowed for trim in addition to the above lengths, and all logs were usually "nosed" to facilitate logging on the steep hillsides. In all of the woods operations, a policy of clean cutting everything was adopted. After the large logs were taken out, the tops, limbwood, and even the stumps were cut and stacked and used later for fuel wood or charcoal purposes. During the following spring, the area was immediately replanted.

The following costs may be of interest on these operations. It is estimated that it costs from 60 cents to 80 cents per cubic meter for felling and cutting the trees into log lengths. In the case of the beech, the cost usually runs from 80 cents to $1.00. For transportation one mile to the mill, it cost 80 cents per cubic meter before the war, whereas during 1918, the cost was from $1.60 to $2.00 per cubic meter. Each wagon load of

logs consisted of an average of about one cubic meter or about 424 board feet of lumber. The oxen cost about $200 per pair prior to the war, whereas during 1918 a pair brought from $1500 to $2000.

When the operation was running to full capacity, 60 men were employed in the woods. Altogether, including those employed in transporting the logs there were 220. These men received from $2.00 to $2.40 per day, and worked 12 hours. All woods work was done by contract, and when the labor supply became short, military labor was supplied in some cases by the army. The full woods corps of 220 men produced an average of 80 cubic meters of saw logs and fire-wood in one day. All fir logs up to a size that would make an 18x18 centimeter beam were hewn by hand in the woods. Logs from 20 to 23 centimeters in diameter at the top end were required for this purpose, and only silver fir was hewn. All hewn beams had waney edges.



CLEARED AFTER CUTTING

Cut-over beech forests at Vallombrosa. After the logs are removed, limb wood, tops and brush are stacked up and after seasoning are used for fuel wood and charcoal. After the stumps are removed, the area is replanted at once to silver fir.

The old sawmill was one of the most interesting features of the forest and it was indeed a busy place during war time. It was originally placed here by the Benedictine monks about 200 years or more ago, and until recent times was operated entirely by a water wheel. This mill had a normal capacity of about 16,000 to 21,000 board feet per day of ten hours. However, when beech was sawed only about 10,000 to 12,000 board feet were cut per day. During the war, the mill ran in two shifts, but frequently on account of the scarcity of labor and the consequent lack of logs only one shift was used.

The mill was built entirely of stone, and instead of the conventional log pond so familiar on our larger operations in this country, a small truck was loaded in the log yard and moved by hand into the mill. The latter was equipped with two gang saws, one of German and the other of Swiss manufacture. The former had fifteen saws in the gang frame and the latter twelve saws. The German saw made 190 strokes per minute while the Swiss saw made 200 per minute. There were also two circular saws running 1,900 revolutions per minute for edging and trimming. The kerf of the Kirchner saw was only two and one-half millimeters or about three-sixteenths inch, which is far less than saws used in this country, consequently the waste was not so much. The sawmill manager estimated that 30 per cent of the logs which came to the mill were made up of waste, including sawdust, slabs, edging, bark, etc. However, in contrast to conditions in this country, none of this was allowed to go to waste. The sawdust was burned as fuel, or made up into briquets, and sold in the neighboring communities. The slabs, trimmings and other edging were converted into charcoal in the sawmill yard, while the smaller edging, bark, etc., were used for fuel purposes. About 20 men and 20 women were employed in the mill and in the mill yard. The sawyers received $1.60 per day, the other men $1.30 and the women 70 cents per day. The working hours were from 7 to 12 in the morning and from 1.30 to 6.30 in the afternoon. The women were served with lunch in addition to their pay by the officials. During the winter time, the water-turbine was resorted to entirely whereas during the summer, owing to the lack of sufficient water flow, electric power from Pontassieve in the Arno Valley was used. A sixty horsepower motor was used for the latter purpose. Silver fir normally was seasoned for about 8 to 10 months before shipment, whereas during the war no regular seasoning was done as the demand for lumber was so



STAKES FOR WIRE ENTANGLEMENTS

Some of the 20,000,000 stakes required annually for barbed wire entanglements at the front during the war. The stakes were collected from points in the Italian forests throughout the peninsula. These stakes were cut from the forests of Vallombrosa and consist of beech, silver fir, pine and chestnut.

urgent it was even used in the green state.

It is estimated that the cost for sawing silver fir before the war was between 70 cents and $1.00 per cubic meter, whereas it was considerably higher during 1918. The sawing costs, however, were kept down on account of the mill running to full capacity nearly every day and complete utilization of the product was possible.

As noted above, the fir lumber was used for barracks and general war purposes. The best clear stock of beech was used for airplane propellers and for cars, the remainder being used by the navy and for trench timber, railway and artillery purposes, etc.



SILVER FIR FOREST IN ITALY

A view over the silver fir forests of Vallombrosa showing the areas of mature forests cut clear for war purposes and the little settlement near the Monastery in the distance. As a summer resort this is a favorite vacation place for the diplomatic corps and government officials from Rome. From the cool forests one can look 2,600 feet below in elevation to the hot, dry valley of the Arno, with its picturesque vineyards, olive groves and cypress-dotted hills about Florence.

The lumber product from this forest was transported by motor truck to Pontassieve, the closest point on the railway about twelve miles distant. Six cubic meters of fir or approximately 2,500 board feet were considered a load whereas only four cubic meters of beech or 1700 board feet of this heavier wood was transported in each load. Two round trips were made per day in the winter time and three during the summer when the roads were in better condition.

The consumption of charcoal in Italy has always been very heavy because of its almost universal use for domestic purposes, both for cooking and heating. At Vallombrosa a large quantity had always been made, even in the time of the monks during the Middle Ages. Prior to the war, this forest alone produced annually about 220,000 pounds of charcoal. This forest had always contained a great deal of beech, and up to recent years the only method of utilizing this wood was by means of converting it into charcoal, thus reducing this wood in weight so that cheap transportation to market was permissible. The principal centers of consumption were at Florence, Pontassieve and many cities in the thickly settled lower valley of the Arno.

The best wood for charcoal in Italy is beech on account of its density, but during the war limbwood, stumps and defective pieces of fir, chestnut and pine were used as well in spite of the fact that they were considered much inferior. The process of making charcoal consists of cutting the wood into small sizes by splitting. The best size was considered to be one meter or about three and one-third feet long and pieces from two to three inches in diameter. It was seldom possible to have all the sizes of this shape inasmuch as tops, limbwood, chunks of stumps, slabs, and edgings constituted a large share of the material. A level round space about 60 feet in diameter is cleared and the pieces are built up in the form of an obtuse cone. No standard sizes of piles were used, although the usual size consisted of a quantity of forty cubic meters or forty sters. Over the pile is placed earth and sod to prevent too rapid combustion, and the pile is lighted from the outside, a chimney being left at the top in the center to form a draft. The reduction of the wood to charcoal form requires about a week, but this varies considerably depending upon the amount of wood, its size and dryness and the state of the weather. When the wood is of average dryness the resultant charcoal consists of only about 20 per cent of the original weight of the wood and only about one-half of its original size. The charcoal is trans-



A TWELFTH CENTURY TOWER

The picturesque old bell tower of the Monastery at Vallombrosa. One of the most pleasing and attractive features of the little woodland settlement at Vallombrosa was the periodic ringing of the Monastery bells. This is the oldest part of the Monastery, which was built in the Twelfth Century

ported by ox-carts or by motor truck to the railroad. The average load in the case of a motor truck is three tons. Years ago, charcoal was transported to market entirely on mule back, each mule carrying a sack of one quintal, which is equivalent to about 220 pounds. The slow moving of a few mules, each with its heavy load of charcoal on its back, is a common sight even today throughout the mountainous sections of Italy.

Prior to the war, this charcoal brought about two dollars per quintal of 220 pounds, whereas during the fall



THE ANCIENT SAW MILL

Log yard at the old saw mill of Vallombrosa. This saw mill was established by Monks of the Benedictine Order several centuries ago and is still in operation. In the winter when the water supply is sufficient the mill is driven by direct water power, whereas in summer by electricity furnished by a large power plant near Florence.

of 1918, it was bringing $8.00 for the same amount. In all of the above values, the normal rate of exchange, that is, approximately five lire to the dollar, has been used. During the war, the rate of exchange fluctuated so greatly that this is the only fair basis for arriving at approximate values.

A great deal of experimental work in the replanting of the Italian forests has been carried on at Vallombrosa. Seven excellent nurseries, comprising about 20 acres, have been developed, and they have an annual capacity of about 1,000,000 plants. However, a good portion of the area is devoted to experiment stations so that is not a fair estimate of its total productive capacity. The principal results of their experimentation is that silver fir has been demonstrated to be the best tree for planting on their higher mountain levels. It is especially desirable on account of its rapid rate of growth, ease of planting, freedom from insects and other diseases, the high quality of the wood produced and the fact that it will grow in dense stands and to large size, that is, it continues its rapid rate of growth up to an age of ninety to one hundred years. Norway spruce has been tried as well as European larch and other species, but they have not proven to be nearly as successful as the silver fir.

The general practice is to retain the seedling in the seed beds for two years, after which they are transplanted into so-called transplant beds for a period of three years. It is estimated that these five year plants cost $1.20 per thousand to grow under normal conditions, prevailng before the war. It costs from $4.00 to $4.80 for plantng alone so that the total cost runs from $5.20 to $6.00 per thousand for the total cost of reforestation. The plants are placed in the cut-over forests or in the open field one and one-half meters apart each way, whereas pine is planted two meters apart each way. Rectangular planting such as we use in this country is not used in Italy, the alternate method—making each tree an equal distance from every other tree being used. Planting is done both in the spring and fall of the year, but for general purposes, spring planting is considered the best. March and April are considered the best months, whereas in the very high elevations, on account of the frosts, planting is done sometime as late as in May. When



CORD WOOD IN ITALY

Delivering cord wood in the city. The two-wheeled cart is the usual form used for delivering fuel wood and this was a common sight in all of the Italian cities during the war. Prices of from $30 to $50 per cord for fuel wood were received during the year 1918.

chestnut is planted it is also placed two meters apart. Beech has been regenerated entirely by natural means, but the Italian forestry officials are planning to cut all beech off at maturity or before and reforest with silver fir. As the young trees develop the plans of management call for an improvement cutting, that is to weed out the more defective and inferior specimens and give the better trees an opportunity for greater development and growth.

OREGON'S SLOGAN CONTEST

THE following slogan was awarded first prize out of a total of 1,150 submitted, in the recent fire protective slogan contest in Oregon:

"Lumber, fuel, beauty, joy,
Forests furnish, fires detroy."

PROGRESS OF FORESTRY IN CHINA

BY JOHN H. REISNER,

DEAN OF COLLEGE OF AGRICULTURE AND FORESTRY, THE UNIVERSITY OF NANKING

I THINK the best evidence that interest in forestry in a practical way is increasing in China is the large number of hsien magistrates, agricultural societies, agricultural and forestry companies, and other individuals who have bought either seeds and seedlings for nurseries, or trees for forest planting this last spring from the various forestry stations and institutions from which they could be purchased. It is interesting to note, and it argues well for the future, that forestry in China seems to be developing from the bottom upwards, from the lower and smaller political units to the higher and larger units, with the Central Government doing practically nothing at all. This is in marked contrast to forestry in Western countries, where the work is usually carried on by and is dependent upon the Central Government. One has frequently heard the criticism that there can be no hope for forestry in China until the Central Government takes hold, organizes, and provides an adequate budget for the prosecution of the work on a national scale, and until national laws can be passed and adequate administration provided guaranteeing protection to those who plant trees. I do not believe this is true. From what I have seen and personally experienced, I believe that in and through the smaller government units and semi-political agencies, such as agricultural societies, forestry can be placed on a good working basis—on a progressive basis, that naturally will be greatly strengthened when the Central Government takes hold of the problem, but that can and will function independently in the meantime.

I have not been able to gather complete data except from Mr. Soong Ding-moo, of the First Provincial Forestry School and the University nurseries, but between the two, seeds and trees were supplied this last spring for nurseries or forest planting, mostly for nurseries, to 159 district magistrates, agricultural societies, companies, experiment stations, and individuals. In addition to these, the "Educational Forest Enterprise," which I shall mention again later on in more detail, supplied seeds and trees to the amount of about $2,500, and the Yangchow



CHINESE NOTABLES ENTHUSIASTICALLY PARTICIPATE IN ARBOR DAY PLANTING

The College of Agriculture and Forestry, at Nanking, is doing laudable work to accomplish the reforestation of China's deforested hills. Due mainly to the untiring zeal of D. Y. Lin, a graduate of the Yale Forest School, Arbor Day in China is now practically an accomplished fact. It was celebrated on April 5, 1920, and the above photograph was taken just after the Arbor Day ceremonies. Mr. Lin is seen standing near the center of the picture, and a little in front of him to his left is the Governor of Shantung.

nurseries, probably the largest private nurseries in the province, if not in any province, which have a capacity of several million seedlings, are reported to have had a good year's business. Seventy-five per cent of the seeds and trees supplied by the First Provincial Forest Station were distributed within the province. Only about 12 per cent of those sent out by the University nurseries stayed in the province, while eighty-eight per cent were distributed in Anhwei, Honan, Chihli, Shantung and Chekiang, in the order of importance named. This is an entirely new development, and with education, demonstration, and experience will rapidly increase.

The First Provincial Forestry Station of Kiangsu, situated close by the famous Ming Tombs at Nanking, was established in 1916, by the Provincial Department of In-

dustry, with a budget of $6,000. This was increased to $20,000 during the first year, under the present director, Mr. Soong Ding-moo, a graduate of the Philippine School of Forestry, and to $27,000 the second year. The station has under its control and supervision two sub-stations, where large planting operations are being carried on. The central station has about 1,100 mou of land, a good part of which is in nurseries. Last year, the central station raised in its nurseries 1,800,000 seedlings, and had 1,200,000 transplants, or a total of 3,000,000. The Mo Fusan sub-station contains almost 20,000 mou of land, and by the end of this season will be entirely reforested. The second station is at Pao San, where considerable planting has been done on several of the more important dykes. Young trees are not only produced at these stations for the government's own use, but for sale and distribution. Tree seeds for nurseries and young trees for forest or nursery planting have been supplied as follows, this year: In Kiangsu province, to fourteen district magistrates, twenty-three agricultural societies, twenty-four other agricultural or forestry establishments, and twenty-nine individuals. Outside of Kiangsu province, supplies were provided for eighteen agricultural and forestry establishments and sixteen individuals.

The Educational Forest Enterprise was established in 1916, and has secured a very extensive mountainous tract of land (over 100,000 mou) just northwest of and across the river from Nanking and west of Puchen. Funds to carry on the work are provided from a small proportion of the budgets of certain provincial schools. Extensive nurseries are maintained, which not only furnish their own planting stock, but from which they sold this past spring, as noted above, $2,500 worth of stock. The forest planting which they are carrying on is the largest in Kiangsu province, and ranks high among the very largest in any part of China. This spring already they have planted several millions of trees. The work is under the supervision of Mr. Y. Chen.

Large nurseries have also been started this year by the Peking-Hankow Railway at Huang Shang Pi (station), Honan, under the direction of Mr. Ngan Han, formerly co-director of the Forest Service organized in 1916 in Peking, but later disbanded. This is more or less of a private enterprise on the part of this Government Railway to make provision for its own supply of ties and other timber needed for construction and repair work. It is a wise and commendable undertaking on the part of the railway, and I understand some agreements in this connection have been negotiated between the Ministries of Communication and Agriculture and Commerce, looking forward to the extension of such work.

The Lung-Hai Railway has also started a large nursery at Chengchow, Honan, looking forward to a future



AN ANCIENT CHINESE TREE

Said to have been planted by Emperor Yung Lo (1360-1424), this ancient gingko stands in one of the courtyards of T'an Che Ssu, a monastery in the vicinity of Peking, built 400 A. D.

permanent supply of timber to meet their needs. The work is under the care of Mr. J. Hers.

The Tcheng-Tai Railway, which connects the capital of Shansi province with the Peking-Hankow line, started a nursery and reforestation work several years ago in order to furnish certain of their equipment supplies.

Governor Yen Hsi-shan, the able and progressive Tuchun of Shansi, this spring distributed 350 pounds of *Robinia pseudo-acacia* (black locust) seed for nurseries throughout the province, as the beginning of an extended forestry policy which he is inaugurating.

The Kiangsi Provincial Government carries an annual budget of $20,000 for forestry work and has three forest stations, one at Kuling specializing in tea and Tung-yu, one at Tungting Sz specializing in Tung-yu, and one at Fu Kuo hsien, devoted to forest plantings.

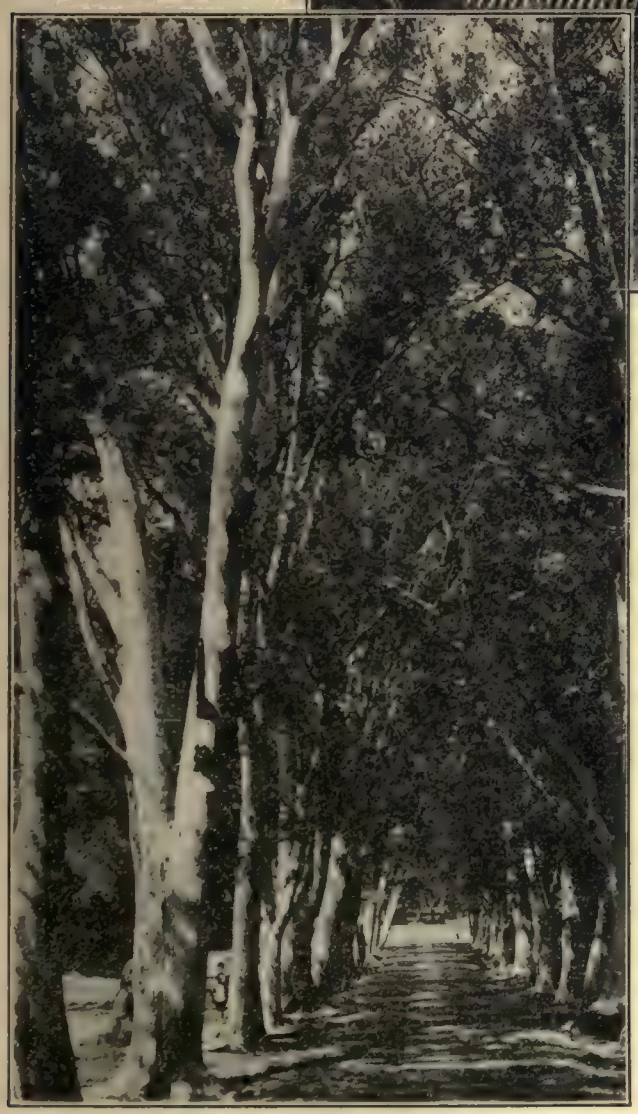
In Chekiang, a number of leading citizens have organized the "Yuin Yao Company" with a capital of $80,000, and fully subscribed, and being paid in at the rate of 10 per cent a year, the annual payments of $8,000 being used for forestry work, mostly planting. This large company was an outgrowth of one of Mr. D. Y. Lin's lecture trips to Hangchow at the invitation of Governor Treh. Mr. Y. Chen, who is managing the Educational Forestry Enterprise is also directing the work of this company.

The colonization work which Mr. Joseph Bailie (now on colonization work in Manchuria) started on Purple Mountain at the time of the last famine, in 1912-13, has developed very largely into afforestation. This past spring (1919), about 700,000 trees, mostly pines, were planted out by the Colonization Association. A large part of this famous old mountain is now planted with trees, and is beginning to show "green" instead of its centuries-old "brown." With its favorable location along the Shanghai-Nanking Railway, where it is seen by thousands of passengers, daily, and as the trees grow larger, Purple Mountain will become increasingly important as a practical demonstration of what can be done with many thousands of mountains similar to it.



A BEAUTIFUL SPECIES OF THE PINE FOUND ONLY IN CHINA

Dating back to the Eighth Century, this wonderful pine stands at Chieh T'ai Ssu, in the courtyard of a monastery, and the beautiful avenue of these remarkable trees, seen at the left, is found at a temple-mausoleum near Peking. This is said to be the finest avenue of these pines in China and consequently in the world, as the species is found nowhere else.



A MAGNIFICENT AVENUE OF PINUS BUNGEANA

In addition to the teaching work of the College of Agriculture and Forestry, extensive nurseries and a seed department are being developed. Both nursery stock and seeds are sold as cheaply as possible. Material was furnished, this last spring, as noted above, for thirty-four nurseries under Chinese direction and six under foreign direction, the latter mostly in connection with mission schools. In addition to seeds about 300,000 seedlings

were sold. This spring's nursery planting is treble that of last year.

The afforestation work commenced by the Germans at Tsingtao and which is being carried forward by the Japanese is probably the largest piece of forest planting as yet accomplished in China.

In Chekiang and Kiangsi there is one forestry school each, of middle school grade. In Kiangsu, some forestry



ANOTHER VIEW OF THE ANCIENT GINGKO

This gives a good idea of the dignity and beauty of the old tree as it stands in the monastery courtyard, the massive trunk and base of which is shown in an accompanying illustration.

is taught in the First Provincial Agricultural School (middle school grade). The University of Nanking, through its College of Agriculture and Forestry, offers a college course of five years in forestry. This latter is the only college-grade forestry school in China, and from its beginning has received support from a number of provincial governments, as well as the Central Government, and the Forestry Fund Committee of Shanghai.

The above evidences of progress along practical forestry lines are only those that have come to my notice. There are doubtless others, but these are sufficient to show the increasing interest in this work. The actual results, in point of all the work that is waiting to be done are relatively small, but in view of what was being done but five years ago, they show a tremendous progress both in interest and actual work accomplished.

"As of possible interest to your readers," writes Forsythe Sherfessee, Forestry Adviser to the Chinese Government, from Peking, China, "I enclose four photographs, two each of rather remarkable specimens of *Ginko biloba*, and of *Pinus bungeana*. The Gingko is well known abroad, where it has been successfully introduced. Its special interest is not only in the rare beauty, form and delicacy of its foliage (whence its name in English of "maidenhair tree"), but also in its remote geological antiquity. You are familiar, of course, with the successful use which has been made of it in Washington for street and park planting. It survives naturally only in the Far East and even here (with one possible exception, reported by Meyer) is confined to graves, temple grounds and gardens. The Chinese name, Pai-kuo shu ("white fruited tree") is derived from the appearance of its fruit, the kernel of which is said to have medicinal value and is extensively used by the Chinese as an ingredient in soups. The Gingko is *said* to represent the sole surviving link between trees and ferns.

"*Pinus bungeana* is much less known to the outside world being restricted to a very narrow habitat in northern China (principally in Central Chihli, the province in which Peking is situated, and in a few places in the neighboring provinces). It is one of the most remarkable of all trees on account of the dazzling whiteness of its bark, a feature which renders it wholly and strikingly unique. In addition, its form is graceful and picturesque, and its foliage unusually delicate. As in the case of the Gingko it occurs naturally rarely if at all, but is extensively planted around grave-mounds, in temples and in gardens. It is known among foreigners as the "white-barked pine" or else as the "white lace-barked pine," the latter on account of the delicate lace-like tracery left on the trunk as the outer bark peels off. But above all, it is the extraordinary whiteness of its bark to which it owes its high interest—a whiteness as though it had been newly white-washed or carefully painted."

FAMOUS TREE SUCCUMBS TO OLD AGE

AN Associated Press dispatch from London says that a famous old mulberry tree in North London under which 144 years ago it is said the American Declaration of Independence was first read in England, has fallen under the weight of its age.

American Boy Scouts attending the International Scout Conference there visited the tree only a few days before it crashed and its history was told to 300 of them, who had their photographs taken beneath its branches.

The tree stood on one of the lawns of the Mildmay Conference Hall. Many religious leaders have addressed meetings in its ample shade. Hundreds of requests for chips from the tree are being received.

FOREST RECREATION—THE MIGHTY ROCKY MOUNTAIN TROUT

BY S. E. DOERING

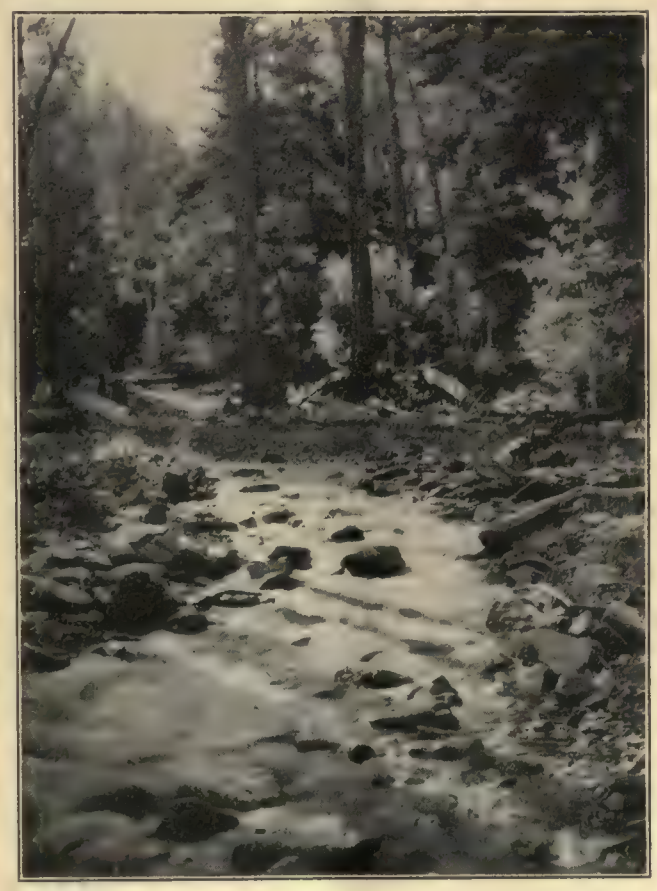
At the end of the season it is right that stock should be taken of resources which go to make up any activity. In the field of recreation the most active time of outdoor play is in the summer and fall. Especially in the fall of the year the fact is brought home to people closely in touch with recreation out of doors that we are fast losing some of the recreation values found in the wild life of the forests. Open seasons are depleting ranges that are now under-stocked with game and a terrific demand for fishing is reducing the fish population in certain streams to a point where years will be needed to bring back the former conditions. It is proper then that this number of "American Forestry" have in the Department of Forest Recreation a discussion of these problems when they are still fresh in the minds of all recreation users of forest lands. Game and fish play a very important part in all recreational use of our forest lands and the Nation today is facing a big problem in preservation and propagation so wild life of forest areas may continue to be one of the attractions which lure people to the woods, lakes, peaks and canons.—Arthur H. Carhart, Editor, Recreation Department.

"LESS go campin'."

"Pa" spoke the magic words which set Billie's heart a-flutter and brought a glad smile to the wan, tired features of Mother. Pa needed a new suit—everybody knew that but—he "guessed the money would go for gas and a new tire" for that ever dependable family servant—"Tin Lizzie."

That night, well toward wee hours, the kitchen table was cluttered with poles, "flies," and much tangled line while Pa and Billie, between tasks, waxed enthusiastic and caught bigger and bigger ones, bringing to silent mother a waft of air from cool, cloudless, azure skies; projecting on the screen of her memory a delicate picture of flowers growing amidst rocks where haughty pines stood constant guard; of rippling waters and golden sunshine; songs of twittering birds, and timid, wondering wood-dwellers. Best of all there was Peace—a harbor of rest far removed from the turbulent sea of humanity.

Where away? That was a mighty question, one which they debated far into the night for, "whoever, anyway, ever heard tell of going camping where there was no fishing?"



FIFTEEN YEARS AGO THE STREAMS AND LAKES OF THE ROCKY MOUNTAINS ABOUNDED WITH LEAPING, BLACK-SPOTTED TROUT, BUT WHILE THIS STREAM IS CAPABLE OF SUPPORTING MANY FISH, IT IS BARREN NOW

It was a problem because, today, there are so many places depleted of stream and forest life that it is difficult indeed to find the "heart's mecca."

Fifteen years ago the streams and lakes of the Rocky Mountains abounded with leaping, black-spotted trout. While in their native state they are not overly prolific, there were many, very many, in those days. Today, the fisherman faces a far different problem—a serious one. The streams and lakes are being depleted at a rate that not only astounds the native mountaineer, but places him in a situation which may be met only by herculean efforts on his part if the former status of nature is to be maintained. It is up to him to solve this problem: The stocking of all lakes and streams with young fish in such manner as will insure a constant supply without exceeding the capacity of the waters. In this, he will meet the enormous demand of our continental public that the "Tin Lizzie" (with due respect to all other utility claimants) has placed within reach of the mountains. This scope, you will doubtless agree, includes all of the United States.

Fifteen short years have brought changes here that are staggering in their magnitude. The Federal Government, the Forest Service and co-operative citizenry have built thousands upon thousands of miles of auto road into the farthest reaches of forest and mountain. Then, there was only the bounding deer and crag-loving Big Horn in a wilderness of solitude. Now, there is a constant stream of travel in luxurious autos; people a-foot; people on horse. Everywhere it is people, people. Where there was nothing before but solid rock walls and impenetrable forests, the Forest Service has built hundreds of miles of beautifully engineered trails that the most timid may travel in safety. Today, fishermen are tangling lines and quibbling over a small trout in waters that, ten years ago, seldom felt the twirl of a line. There are tent-pins,

crude stone fire-places, and dried "bough-beds" in uncounted numbers where before only a coyote paused now and then to yap in his nightly prowl.

In the last five years, cabins—summer homes where people will come to live a few weeks each summer, have leaped into existence by scores. Small colonies and "all summer" camps have sprung up in most romantic and remote regions where the ring of an ax was unknown lest some native blazed his way into mountain meadows where he might keep a flock of sheep or herd of cattle. All this has come about through public clamor for play and recreation grounds. The car was the basis of the invasion it alone made possible. We cannot decry the great American public their God-given impulse to clamor for and demand beauty, rest, peace, and recreation. It is as natural that people play as it is natural that cub bears frolic. A wise Creator touched the soul of each of us that we might crave these things and have them. They are a bath for the soul that might otherwise warp and narrow in the conflict of human existence.

Therefore, we of the mountains would say to you: "Come, it's your playground — your haven of soul-rest." The mighty mountains must ever remain the Vacation land of America's democratic populace. God meant it so; so be it.

The folk of the mountains and Forest Service have been entrusted with the guardianship of this priceless treasure. You of the north, the east, the south, the west, should know and realize that the task is one of stupendous magnitude. Perhaps you will grasp its enormity when I tell you that there are just a few thousand Forest men to keep the streams free from pollution, keep them stocked with fish, keep the forests abounding with natural life for the benefit and pleasure of yourself and posterity, maintain the endless miles of road and trail, and preserve the timber that is fast becoming our most valued asset.

In this gigantic garden which you have given these Service men to protect, 115,000,000 people are entitled to come and play whenever they may choose; there is no feature closed or forbidden. In caring for all this, the Service has to depend upon very limited funds alloted us by an austere and solemn Congress. These men do not criticize Congress. Congress must feel the pulse of the whole nation and must prescribe accordingly. They work on with the hope that the American citizen will, before long, come to a fuller realization that the Forests need his earnest co-operation and fore-thought.

Time and space forbid that I go into the many phases of this work with which the Forest Service is entrusted. I can tell you here, very concisely, of one phase of the work; one very essential and necessary phase of which little is known or practiced at present, namely, fish culture.

What is fish culture? It is a term applied to the art of raising fish from the egg or "spawn" to the marketable product. Why the need for fish culture? Because the trout family in their natural environment and habit, do not reproduce sufficiently to meet, anywhere near, the fast increasing and already enormous demands of the public.

There are three species of trout living within the higher reaches of the Rocky Mountains; the native, the

While this number of "American Forestry" is in the printing or being carried to you in the mail, men will be standing hip-deep in icy water netting fish from which eggs will be taken and sent to the hatcheries so some years hence you or your friends may angle in some trout stream with a reasonable chance of having a tussle with a member of this season's hatch. At this season when most people seek a cozy fire-side these men who love the work are active under the most trying weather conditions. Mr. Doering is the possessor of first-hand knowledge of how fish are raised so they may lure some fisher-sportsman to a forest vacationland. Few people realize the rigors of carrying on this raising and planting of trout. In this, the writer sketches briefly the methods followed and barriers overcome. It is of interest to every recreation user of every forest land and carries information of value to all.—Arthur H. Carhart, Editor, Recreation Department.



AFTER ALL, THEIR'S WAS AN INGLORIOUS END—BUT USEFUL. LET US HOPE THAT THEIR SPIRITS HAVE PASSED SAFELY TO THEIR HAPPY SWIMMING GROUNDS



WHEN TRAPPING IS NOT READILY ACCOMPLISHED—AND IT IS SOMETIMES RATHER DIFFICULT, THE OLD TIME SEINE, OR DRAG-NET, WILL PROVE QUITE EFFICIENT

rainbow and eastern brook. The native is so-called because of its having been, as its name implies, native to these waters. The other species have been "planted" here from points east and west. The native is usually the smaller of the three species and more wiry; penetrating farthest into mountain fastness headwaters. He is also the greater fighter, or "game fish," of the trio. Following him closely in "game" spirit is the rainbow which, however, grows faster and heavier. Third is the eastern brook, more content to be lazy, take the world with a smile, wax fat and grow a pound a year in waters containing foods suitable to his not at all discriminating appetite. Hog-like, he feeds on most anything. Generally he is found in stiller waters where no great effort need be expended in collecting vital necessities of life. Very often, when found in high, cold waters, he will bite quite snappily and occasionally put up a game fight. The native and rainbow remain the choice of the mountaineer. They are far more venturesome, are inveterate explorers and discriminating in their food. They are, so to speak, quite American.

All three trouts belong to the salmon family and generally bear the salmon color. In a day's fishing one will often find a variation in color from light red to a very



IT IS HIGHLY IMPORTANT THAT EVERY BARREN WATER BE STOCKED, AND THIS IS ONE OF THE FIRST STEPS IN THE PROCESS. NETTING THE FISH WITHIN THE TRAP TO BE STRIPPED FOR "PLANTING"

dark red. This coloring is due to water temperature and character and quantity of food available and not at all to sex or species as a great many people believe. A fish taken from one water to another will, in all likelihood, change color of meat. I would say that the redder or darker the meat, the more healthy and nourished the trout.

In waters where there is an abundance of feed, a minnow trout will make an average growth of seven inches



STRIPPING THE FISH FOR ARTIFICIAL HATCHING. THIS SHOULD BE DONE ONLY BY SKILLED OPERATORS, FOR WHILE IT IS SIMPLE, THE FISH MUST BE HANDLED VERY QUICKLY AND CORRECTLY IN ORDER TO SAVE THEM AND SECURE THE MAXIMUM NUMBER OF EGGS

in two years, most of the growth being made the second year. If he continues in good waters a period of five years, he will test the strength of your rod and tax your skill to the utmost. He will doubtless cause you to tell that old, old yarn about the "big one" that got away. Your friends will wag their heads ominously and perhaps the minister will call to expostulate the need for more regular attendance at church.

The trout abounds and thrives in waters varying in temperature from 45° to 55° Fahrenheit. Cold! Yes, it's cold. Just consider a moment that his body temperature is around 45° lower than that of the human body and you will realize that cold water is very essential to him. It must be more than cold, it must be clear and uncontaminated and running freely all the time.

Trout demand a great deal of oxygen and they find a sufficient quantity only in fast moving, tumbling waters. The motion of the water keeps it aerated and charged with this element. Ask any old fish raiser what a trout lives on and he will tell you—"air."

A trout placed in a bucket of water will live only until all the oxygen is exhausted. An hour will render him torpid, in less than two hours he will be dead. For this reason, trout placed in brackish or sluggish waters with a temperature of 65° or greater, will not survive. Not much space can be given here to the food of the trout although it is a matter of utmost importance and one which must be thoroughly understood before one embarks upon the troubled sea of fish culture. The known "good waters" are all gone, but there are many remaining barren waters that must come under cultivation through some means or other.

It must be understood that the trout does not feed upon plant life, he feeds upon the insects which cluster



IN ARTIFICIAL HATCHING THE "MELT" IS THOROUGHLY MIXED WITH THE EGGS BY PLACING BOTH IN A SHALLOW PAN CONTAINING WATER AND GENTLY MIXING THE CONTENTS BY ROTATING THE PAN

upon and feed upon plant life. Now, to introduce the species of plant life which will in turn collect the certain species of insect life conducive to the life and well being of the trout, is a field of study that is almost wholly unexplored, yet every fish man will tell you that it must come to pass before we can materially increase our fish supply. The trout, I regret to say, is cannabalistic, feeding upon its own kind when necessity compels and in numerous instances when necessity does not compel. The

absence of small fishes or minnows along the thin water of streams and in the inlets, is a pretty good indication that the waters do not contain enough plant life to keep the older fish in good condition. Thus, in stocking the streams with young fish, or "fry" as they are known, it is necessary to exercise great care and no little skill in the selection of waters.

The various State and Federal hatcheries are engaged in producing fry, not in raising them. From the time the little fellows leave the hatcheries until they are freed in the waters, they receive divers kinds of bad handling. Usually it is up to the citizenry to see that they are planted. Too often these tiny fish are taken and dumped into the waters headlong where they come suddenly in contact with an entirely different temperature and surroundings where there is, possibly, no feed at all. The consequent loss is easily apparent.



BEFORE THE EGGS ARE FERTILIZED THEY MAY BE SHIPPED IN CRATES. NOTE THE SNOW AND ICE IN THE PANS WHICH WILL BE USED IN KEEPING THE MOSS COOL AND WET WHILE THE EGGS ARE IN SHIPMENT

In the ordinary season the rainbow trout will begin laying eggs as early as April 15, continuing until as late as May 15, depending upon the elevation of their waters and climatic conditions. The native follows closely here, spawning from May 15 to June 15. The eastern brook delays spawning until late fall, sometimes extending the operation well along into December.

The procedure in natural spawning is the same with all three species. The female will settle somewhere in shallow water where there is sand and slow moving bits of moss and water slime. At a selected spot she sets her fins in motion with the result that, after a time, a small hole is made in the sand, mud, and bits of moss, in which she will deposit a few eggs. The action is called "fanning" by local men. Trout eggs are not adhesive, hence a few may be laid at each fanning point.

After depositing eggs the female will depart, whereupon a male fish will pause over the fanning nest, depositing a quantity of white, slimy substance which fertilizes them. This done he will fan awhile in order to slightly cover them with bits of moss and slime floating about in the water. It happens though, quite often, that this knightly male will eat the eggs, fan until he has made his deposit in the empty nest, then hie away to other fields of conquest. Should, however, the eggs be properly fertilized and covered, there may be many things yet happen them. The water may raise and wash them out, or it may recede and leave them on dry land, or diving birds or snakes may eat them. There are a hundred and one things that may happen to the eggs in course of incubation and something generally happens. It is doubtful if one per cent of the naturally laid eggs produce minnows that reach maturity. Reproduction of the trout is a complicated affair for which nature did not provide very carefully.

Hatching of trout from eggs is a process covering about three months' time. The method of incubation in artificial state is the same as that in natural state except that artificial hatching is made highly successful through the removal of natural enemies and barriers encountered in natural incubation. In studying the artificial method of hatching, it will be readily seen how almost impossible it is for eggs to hatch successfully in native state. The eggs are very tender, being composed of an amber colored liquid. They are round and about one eighth inch in diameter. Any sudden change of temperature, any rough usage, any abrasion will almost surely result in their loss. Then, following this chance, there is a disease, or animal life, very contagious, which is attacking them constantly. Infection on one egg will spread rapidly to all eggs in connection in the fanned hole where native hatching is taking place. Just how this feature is overcome in the hatcheries will be explained later.

During spawning time the male and female fish will crowd into inlets of lakes or follow up the streams in search of suitable hatching grounds that the rough deep waters do not provide. In spawning they "swarm" so to speak. Man has discovered that, in this period, they may be easily trapped and stripped of their eggs. By going up the stream a hundred yards or so above a lake, or into the reaches of some stream where it traverses a meadow-like country in which the fish gather, traps may

be built quite inexpensively of strips of lumber set perpendicularly in the water and about an inch apart. This allows the smaller fish to continue their way up the stream and keeps back only the larger, which are the most valuable from a productive point of view. A similar fence is then constructed at the entrance with a triangular shaped hole provided where the oncoming fish may enter. During the day the trap is closed and the fish stripped in turn and thrown into the waters above the trap, thus preventing them from mixing with those awaiting stripping. Usually the trap is left open at night and the catch "worked" the day following.

Trapping as described above cannot always be reverted to. In many instances, generally in lakes, it is necessary to adopt the old time seine or drag-net if the fish are not gathering at some inlet. A description of this method is not deemed necessary since almost anyone knows how to operate a seine.

Stripping consists of holding the fish by the head in the right hand, belly and tail downward over a pan in which is a small quantity of water. The fingers of the left hand close round the body of the fish in such manner as to massage the belly until the eggs have been ejected. When ready to spawn the trout is very sensitive, and a slight touch will often cause them to eject one or more eggs. The stripping, while simple, should be done by some one skilled in the operation since the fish must be handled rapidly and correctly in order to get them back in the water before harm has resulted and obtain the greatest amount of eggs possible. A new operator will often fail in getting all the eggs or will damage the fish. In the hands of a skilled stripper the loss will seldom exceed one per cent of the number of fish handled. They are stripped in a ratio of three to one or, for every three females stripped, one male fish is stripped of his "melt" or fertilizing sperm cells which have been previously described. To add, though, in this instance: A microscopic examination of the trout egg will reveal two tiny holes opposite each other and penetrating approximately one-third the way through. This male fertilizer immediately collects in these tiny holes and is at once sealed in by nature. Thus is the egg made fertile.

The collected eggs are called "green" in their first stages and may be safely handled and shipped to distant points with proper care. Boxes, or crates, about two feet deep by two feet square are provided with an open space at the bottom to allow the escape of water. The first crate is lowered into the box and held two inches off the floor by means of cleats. On the crate there is first placed a sheet of gauze, following this, a layer of water-soaked lake moss is placed and a thousand to fifteen hundred, or possibly four or five times as many, eggs spread about over the wet moss. In this manner crates are inserted one on top of the other until the last crate is reached, which is filled with cracked ice and this, melting, serves to keep the whole mass below wet and cool at all times.

After collection the eggs are taken to various hatcheries where they are placed in hatching troughs. These consist of ordinary lumber troughs, approximately ten feet long by ten inches deep and the same in width. They are placed parallel about two feet apart in a building that is kept at the proper trout temperature by means of an ordinary stove. It should be kept just warm enough so that the water will not freeze. Into each of these troughs is turned a stream of constantly flowing water. The end of the trough where the water enters is raised a couple of inches in order to give the water a short, sheer drop into the trough, thus thoroughly aerating it. Next, the eggs are placed in hatching trays, from three to five thousand per tray. The trays, just fitting in the trough, are then submerged and may be placed one on top the other as long as they are under water.

Next follows the work of "picking" the eggs. This consists of taking the trays from the trough in turn and closely examining them for infertile eggs and those attacked by disease or otherwise injured. They are quite easy of detection since a few days in water will tend to whiten those which are infertile, diseased, or injured. The fertile, healthy egg is a pure transparent amber. Every tray should come under close inspection at least once every day and oftener if time is available. It is vitally necessary to keep them cleanly picked in order to prevent the spread of ever-present disease.

The first intimation of embryo will come in only a few days after being placed in the troughs. By holding the egg lightly between the thumb and fore-finger and turning it toward a strong light, veins, or, "bloodshot" will be plainly visible, spreading from the center of the egg. Gradually this bloodshot appearance will work toward the center where a spot will form. Later, from the spot, a head and tail will form, gradually extending until it has protruded through the egg. The born fish now has a strikingly odd appearance—a head and tail appended to a sac. This is as it should be. The sac contains the food which will keep the little fellow alive as it gradually stretches out in an oval shape forming his body. From this stage on he realizes his importance as a fish, taking his chances against the current in the bottom of the trough and his living from the microscopic water life. After a month, although appearing as little else than an eye and a tail, they will swim vigorously, play, and suck blood from tiny bits of liver placed within their troughs. After another month they will eat greedily and do well on the stronger meat of beef heart. They may be, and often are, placed in the public streams in this period of infancy although at a decided loss.

Without question it is better to keep these young trout, or fry, in retaining ponds for a period of from two to six months before placing them in the public waters.

Thus, may you learn of the problem. In the streams of the Rocky Mountains there are many places where spawn may be taken; there are many, very many, hatchery sites. The construction of traps and hatcheries and the work of hatching does not take a very large outlay in money. Comparing the outlay in cash to the benefits derived, the cost is insignificant indeed. Fifteen hundred

(*Continued on page* 688)

SCENTED WOODS

BY SAMUEL J. RECORD

PROFESSOR OF FOREST PRODUCTS, YALE UNIVERSITY

WITH the woods of the world to choose from one can easily arrange a whole scale of scents from the sweetest and most delicate of perfumes at one extreme to rank and overpowering odors at the other. The stores of the perfumer's shop will not yield a greater variety than one can find in woods. There too are to be found distinct impressions of flavoring essences, spices and condiments, of crushed fruits, of various kinds of vegetables and of nuts, and a host of other things often too vague for expression.

Were our sense of smell more highly developed and better trained we should find that every wood has its own peculiar scent by which alone it could be distinguished from all the rest. How often do we say that a wood is odorless when we mean that the impression we get is too subtile or vague for definite perception.



A MAGNIFICENT INCENSE CEDAR, NEAR PASADENA IN CALIFORNIA. THE WOOD OF THIS TREE IS VALUED BOTH BECAUSE OF ITS FRAGRANCE AND EXCELLENT WORKING QUALITIES

Both odor and taste are purely subjective. Our perceptions of them do not admit of expression and comparison by means of figures as in the case of other observations. Moreover, smell and taste are quite differently developed faculties in each individual. The impressions we get depend not only on our keenness of scent but also upon a whole train of past experiences and previous impressions. What does "sweet as the breath of kine" mean to the average city dweller?

No one fully appreciates the inadequacy of language—written or spoken—until he has attempted to express in words some unusual odor or taste perceptions. It is then he realizes that they are of the fourth dimensional stuff of which dreams are made. Often the best one can do is to indicate whether the sensation is pleasant or disagreeable, mild or pronounced, and sum up the rest by saying it is peculiar.

Many definitions of an odor violate the first law of definitions by describing it in terms of itself or of some derived product. We say that red cedar smells like a lead pencil or a clothes chest, Spanish cedar like a cigar box, western cedar like a shingle, and that white birch tastes like a spool! English writers have a habit of saying pine smells like deal, in other words that pine smells like a pine plank! Such comparisons, however, have the merit of conveying a pretty definite meaning because they are in terms of things with which we are all more or less familiar. They will have to stand until someone invents an odor scale!

Names of woods are often derived from their odor. Anything that has a frangrance akin to that of our common cedar is forthwith a cedar without any regard to the botanical relationship. In the real cedar family we have not only a great many different species but also various genera of trees scattered all over the world.



WESTERN RED CEDAR IN CALIFORNIA. IS KNOWN ALSO AS SHINGLE WOOD AND IS NOTED FOR ITS FRAGRANCE

There is our eastern red cedar or juniper, the western red or shingle cedar, the northern and southern white cedars, the yellow cedars or cypresses, the incense cedar, the true cypresses, the deodar, the atlas cedar, the Clanwilliam cedar and the famous cedar of Lebanon. They are among our most valued woods not only because of their fragrance but also because of their excellent working qualities and their great resistance to decay and to insect pests.

The Spanish or cigar box cedar, known locally as cedro, is not a coniferous wood but belongs to the mahogany family. In fact it finds its way into the market as mahogany and may not be readily distinguished from that wood except by its odor. Other aromatic woods of this family are the toon or Indian red cedar, the calantas of the Philippines, the margosa or neem of India, and the bead-tree, Persian lilac or white cedar of Australia. Here, too, may be classed the Australian rosewood with its scent of cedar rather than of rose.



LARGE WESTERN RED CEDAR, ON STANISLAUS NATIONAL FOREST, CALIFORNIA

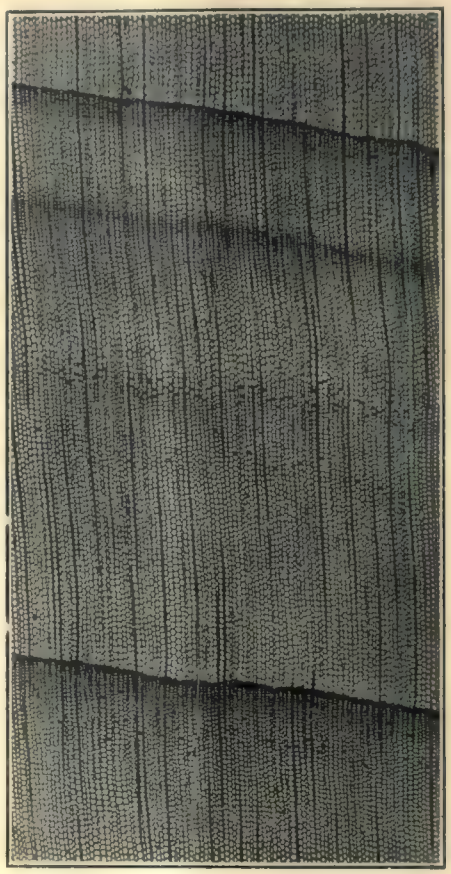


Photo-micrograph by S. J. Record.

CROSS SECTION OF RED CEDAR (*JUNIPERUS VIRGINIANA*) SHOWS THE RESIN CELLS IN ZONES THROUGHOUT THE GROWTH RING. IT IS IN THESE CELLS AND THE CELLS OF RAYS THAT THE RESIN IS FOUND WHICH GIVES THE PECULIAR ODOR TO CEDAR WOOD AND ADDS TO ITS DURABILITY

The Borneo cedar or seriah belongs to the dipterocarp family from which our so-called Philippine mahogany comes. In British Guiana are two woods, the yellow silverbally and the kretty, with cedar-like odor, though they belong to the sassafras family and are closely related to the greenheart used so extensively in building the Panama Canal. The narra of the Philippines and the Malay Peninsula, a wood of the locust family, has a faint sweet odor when fresh. Just as these woods are commonly called cedar because of their odor so other woods without odor are sometimes called by the same name because of their resemblance, fancied or otherwise, to the woods that smell like cedar. The writer has in his possession a cigar box made of "Michigan cedar" which in reality is elm. A certain natural similarity in grain with a touch of color added produces a passable substitute for Spanish cedar for a not too discriminating trade. Certain South American woods are called cedro though they have only the slightest resemblance to the real cedar. Other woods such as yellow poplar and basswood, which have neither odor nor grain, may be printed in the color and figure of Spanish cedar or they may



LARGE WHITE CEDAR, FRAGRANT AND ALMOST IMPERVIOUS TO INSECT ATTACK

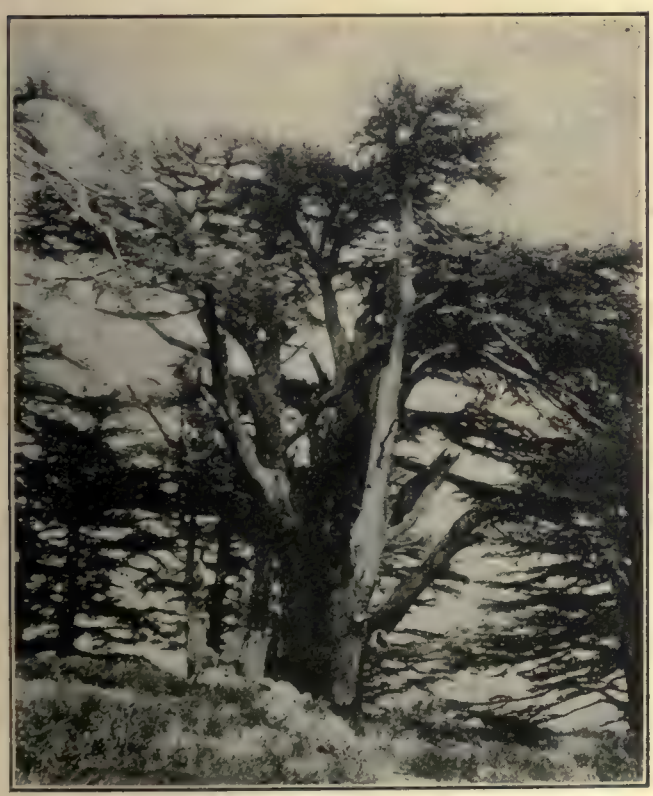
be covered with printed paper. Cedar is used for cigar boxes because the aroma of the wood is supposed to add to the bouquet of a cigar and the trade custom requires that cigar boxes at least appear to be made of cedar.

Cedar is used in various forms for repelling insects. The chips from pencil factories are distilled for their oil or ground up and sold for use in protecting rugs and woolen garments from moths. Chests made of Tennessee red cedar and also of Spanish cedar are widely advertised and used for protection of furs and woolens from moths. Their efficiency is limited, however, and too much faith should not be placed in them. Adult moths are repelled by the odor if it is strong enough, but it takes more than a smell of cedar to keep the eggs, once laid, from hatching or the larvae from pursuing their destructive feeding. Cedar chests are usually well made with tight fitting covers and if articles are free of moths and eggs when they are placed therein they will not suffer attack. About five per cent of the protection afforded by a cedar chest is due to the odor and the other 95 per cent to the fact that it is physically exclusive.



Photograph by H. M. Curran.

A RAFT OF CEDRO LOGS ON THE PARANA RIVER, ARGENTINA. THIS IS THE SPANISH OR CIGAR BOX CEDAR AND BELONGS TO THE MAHOGANY FAMILY



Photograph by G. E. Mitchell.

CEDAR OF LEBANON—A GIANT OF THE GROVE WHICH HAS LOOKED WITH TOLERANCE ON THE RISE AND FALL OF THE POWERFUL OF THE EARTH

We can pass by easy stages from the cedar odors to those of sassafras and camphor of the laurel family. The santol and melasantol and the tucung-calao of the Philippines belong to the mahogany or Spanish cedar family and have a more or less pungent aromatic odor resembling both cedar and camphor. Two leguminous woods widely distributed in South America are much alike in every way except that one is a rich red and the other brown. They are variously known in Brazil as cabriuva, oleo vermelhbo and oleo pardo, and in Colombia and Peru as balsamo, and have an aromatic fragrance suggesting a combination of cedar, camphor and chloroform. One feels the desire to inhale deeply when smelling these woods.



A TWENTY-TWO YEAR OLD CAMPHOR TREE AT ORANGE CITY, FLORIDA, SHOWING CHARACTERISTIC DEVELOPMENT WHEN GROWN IN THE OPEN

Our sassafras has a pleasant odor which is much more pronounced in the twigs, leaves and inner bark than in the wood. The spice bush or benzoin is of the same class. The California laurel or pepperwood has a sweet peppery fragrance. The embuya of Brazil and various other laurels or lauros of South America are more or less highly scented and find many uses on that account. The Brazilian sassafras has a heartwood that is often fairly saturated with an oil with an almost overpowering odor of sassafras. The kalingag of the Philippines is full brother of the camphor tree but the odor of the wood, which is strong and lasting, is almost exactly like sassafras.



ROWS OF CALIFORNIA PEPPER TREES BORDERING A COUNTRY ROAD ON THE HILLS OUTSIDE OF LOS ANGELES

The Borneo camphorwood or kapor has a pronounced camphor odor when fresh. It belongs to the dipterocarp family, nearly all of the trees of which are resinous. True camphor is obtained from trees growing in Formosa and adjacent regions. Some is collected as exudations of gum but mostly it is obtained by cutting the wood into chips and distilling it. There is great demand for this wood for the manufacture of chests, drawers and insect-proof cases, and cabinet makers find it difficult to get enough of the genuine wood for their work. Accordingly they make imitations, using some light cheap wood after first treating it with camphor oil. These imitation camphorwood chests are not durable and the effect of the oil is soon lost. Camphor can be produced artificially from the resin of pine trees.

There are many flower-scented woods. The rosewoods are the most common and there are several kinds on the market. The Brazilian rosewood is known locally as jacaranda, with various qualifying terms to indicate the



A DELIGHTFUL SPOT IN THE MUIR WOODS, SHOWING CALIFORNIA LAUREL BENDING OVER A LITTLE STREAM RUNNING THROUGH THE FOREST. THE WOOD OF THIS TREE HAS A SWEET PEPPER FRAGRANCE

color or other special property. There is still confusion about the botanical status of these woods though they are generally referred to the genera *Dalbergia* and *Machaerium*. There are so-called rosewoods in all parts of the Tropics, but some of them get the name from their rose color. The sweet-scented mimosa of India, Burmah and Ceylon, the griting of Borneo and the blackwood of Africa have a more or less pronounced odor of rosewater. It is said that the wood of the common European elder has a like fragrance when freshly cut.



THE BLACK LOCUST. ITS TIMBER, WHEN FRESH, TASTES AND SMELLS LIKE GREEN BEAN PODS

Myall or violetwood of Australia, the product of two species of Acacia, has the delightful scent of violets which becomes very pronounced when the material is being worked. If one wishes to retain a high opinion of this wood it is well not to taste it. The hackia of British Guiana and the West Indies is said to give off an odor when worked distinctly resembling the tuberose, while the manchineel of Central America and the Antilles is lavendar-scented. The oil of guayac wood, obtained from a South American tree closely related to the lignum-vitae, is used in the perfume industry for the purpose of producing a tea-rose odor. A distinct scent of musk is imparted by the woods of the musk-tree of the Fiji Islands and the muskwood of Australia.

The cumuru or tonka bean of South America is the source of a material used extensively in flavoring snuff. Most of this comes from the pods, but enough is contained in the wood to impart a mild odor of vanilla. Sometimes very oily specimens are somewhat rancid and the perfume obscured. The umburana of Brazil is a soft yellow wood so delightfully scented with vanilla that one is tempted to eat it. In western Australia is a species of Acacia called raspberry jam wood because of its odor which is powerful and almost overpowering when the wood is freshly cut.

Then there are vegetable and nut odors. An English authority says that the fresh wood of the horsechestnut,



Photographs by C. H. Pearson.

A GROUP OF BRAZILIAN ROSEWOOD, KNOWN LOCALLY AS JACARANDA

THE CUMURU OF SOUTH AMERICA

THE MANCHINEEL TREE OF CENTRAL AMERICA, HAS A DELICATE SCENT OF LAVENDAR

a tree often planted along our streets, smells like "rubbed potatoes." The wood of the red bean of Australia is said to smell just like Swedish turnips when newly cut. This turnip odor is also more or less pronounced in our Nootka cypress. Black locust timber, when fresh, tastes and smells like green bean pods.

The ipil and tindalo of the Philippines have a peculiar oily odor resembling that of raw peanuts. The West Indian satinwood suggests cocoanut oil and the paperbark tree of Australia is said to smell like Brazil nuts while being worked. The kulim of the Philippines and Malay Peninsula gives forth a strong aroma of onions, while the pao d'alho of Brazil is properly known as garlic wood. The New Zealand black pine has a faint aroma suggesting new mown hay. A Dutch East Indian wood gives a distillate which reminds one of cinnamon and rhubarb.

Slippery elm wood smells more or less like licorice, the catalpa like kerosene, the pinon pine and sometimes the sugar pine, like beeswax. Dark, resinous specimens of our own southern cypress have a mildly unpleasant odor of rancid butter. The wood of the celery pine of New Zealand is said to have a faint smell when worked, like bad cheese. The pagatpat of the Philippines has a fishy or "swampy" odor, especially when fresh. The cupang and batino of the same country and the so-called stinkwood of South Africa have strong and very disagreeable odors when drying. The oily heartwood of our viburnums has an extremely disgusting smell which is far-reaching when the material is fresh and never completely leaves it. The Australian sandalwood is like burning joss sticks, overpowering and sickly when in quantity.

There are a number of so-called sneezewoods. The Zulu sneezewood has a peppery smell which often excites sneezing and running of the eyes when worked. The acle of the Philippines and the blue mahoe of the West Indies are peppery and are said to excite violent sneezing when the dry wood is being worked by machinery.



A HORSE CHESTNUT IN FULL BLOOM. AN ENGLISH AUTHORITY SAYS THAT THE WOOD OF THIS TREE, WHEN FRESH, SMELLS LIKE "RUBBED POTATOES"

Many woods have an unpleasant odor when fresh and during the seasoning process but later lose it partially or entirely. Our hemlock and certain kinds of fir, and the Philippine cupang are in this class. Oak, particularly red oak, has a peculiar acid smell when curing. The blue gum and certain other eucalypts of Australia smell like acetic acid when freshly worked. The malacadois and tuai of the Philippines suggest aromatic vinegar when newly cut. The urung of the same source has when fresh "a distinct aromatic and somewhat acid odor reminding one of cider." Teakwood, according to one authority, has a "smell characteristic and powerful, like old shoe leather, very offensive when being worked," but another says it

has "a pleasant and strong aromatic fragrance." The dry specimens examined by the writer had a mild rancid odor. Some woods give off a very disagreeable odor when burned. Among these may be mentioned the Indian tamarix, the Philippine bantino and the palo verde of our desert Southwest.



Photograph by C. H. Pearson.

TRUE LIGNUM VITAE, QUEEN'S PARK, BARBADOES, B. W. I.



BARK OF THE ODORIFEROUS SLIPPERY ELM, REMINDING ONE ALWAYS OF FRESH LICORICE

The most famous of all scented woods is the incomparable sandalwood. The true sandalwood (*Santalum album*) is an oriental tree whose use for perfumery and incense began thousands of years ago and whose popularity remains undiminished. The later Greeks considered it one of their greatest luxuries and no festivities were complete without it. There are many false sandalwoods, at least three from India, one or two from the Philippines and Java, one from Australia and another from the West Indies and Venezuela. The Philippine agaru has "a distinct characteristic odor, when fresh, reminding one of sandalwood; it soon disappears superficially, but is again perceptible on merely scraping the surface." The Venezuelan wood is now generally imported as amyris wood and the oil distilled from it bears not the slightest resemblance to the sandalwood.

Fragrant woods have always been held in highest esteem among primitive people and were considered especially pleasing to the gods. Accordingly, they have figured prominently in their religious ceremonies and burial rites. Sandalwood is of the first rank in China and other countries where it can be obtained. In Borneo there is a large tree called kayu gharu which occasionally forms a small blackish and highly resinous heartwood highly valued for in-



A SECTION OF WOOD OF THE CATALPA TREE, WITH AN ODOR PECULIARLY LIKE KEROSENE



PINION PINE GROWING IN CRACK OF ROCKS IN COLORADO. THE WOOD HAS A DISTINCT ODOR OF BEESWAX

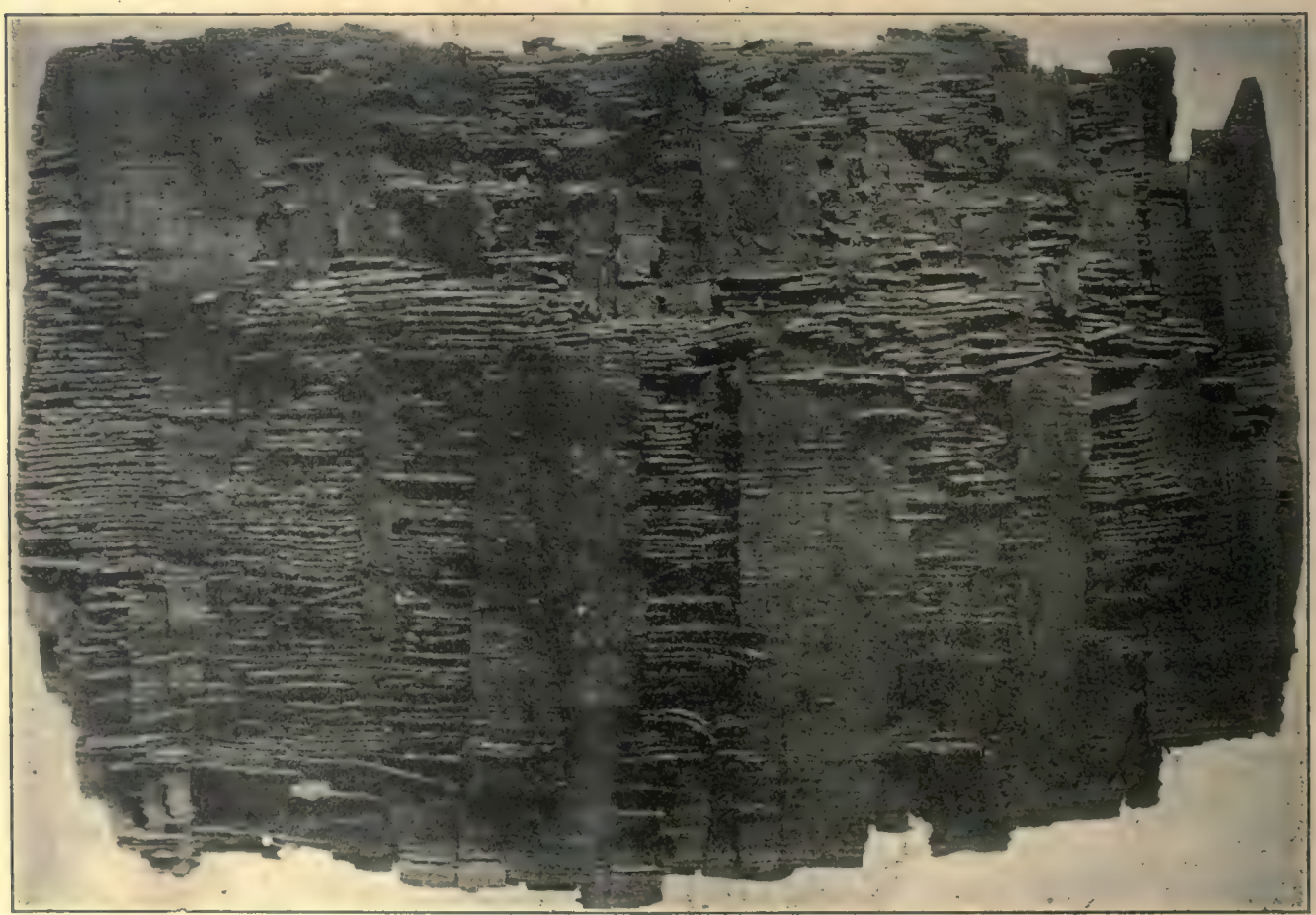


ARBORVITAE GROWING IN A TEMPLE COURT IN CHINA AND BELIEVED TO BE BETWEEN 800 AND 1,000 YEARS OLD. ITS WOOD IS CONSIDERED SACRED BY THE ORIENTALS

cense wood in Malay and China. The roots of a leguminous plant related to the rosewood, produces a low grade incense wood called kayu laka in the Malay region. In some parts of the Himalayas and in the Khasia Hills the yew tree is called deodar (God's tree), the name that is elsewhere applied to a true cedar. The wood of the yew is burnt as incense as is also that of the cypress. One of the favorite woods for incense in the Buddhist temples of India is the juniper. In parts of South America a wood closely related to the lignum-vitae is called palo santo (sacred wood), because of its use for incense in churches.

There are numerous curious or superstitious beliefs regarding fragrant woods. The Burmese have a superstition that beams of balances should be made of the Thitman or prince of woods (*Podocarpus neriifolia*), while a peg of it driven into a house post or boats will avert evil. The Shinto temples are always constructed from the wood of the Japanese aborvitae or hinoki tree. Water pails and other vessels made of our southern white cedar were long held to have a wholesome effect on the contents because of supposed medicinal properties of the wood. It was even believed that water issuing from a white cedar spigot had its healthfulness increased. The northwestern Indians nearly always made their totem poles out of western red cedar, but this choice was probably due more to the fact that the wood is easy to work and extremely durable, rather than to its fragrance. It may be taken as a very good general rule that woods that are scented are resistant to decay and insect attack, and have good cabinet qualities.

A REMARKABLE SPECIMEN OF QUARTERED WHITE OAK



This very unusual photograph was taken of a section of partially decayed wood from an old white oak stump and shows, better than he has ever seen it, the structure of oak wood, writes George N. Lamb, secretary of the American Walnut Manufacturers Association, from Chicago. The surface shown is a radial section, as is the cut of "quarter sawed" wood. The medullary rays that make the "flake" in quarter sawed oak are here shown as upright bands or ribbons of various widths that extend from center to bark in ripples or waves. The above specimen shows this characteristic structure almost better than would a diagramatic drawing. In this case, at least, the rays proved to be harder and more durable than the rest of the wood.

FOXES—AND WHAT WE KNOW OF THEM

BY DR. R. W. SHUFELDT, C. M. Z. S.,

MEMBER OF THE AMERICAN SOCIETY OF MAMMALOGISTS

VARIOUS kinds of foxes are found in the Old World; but as a matter of fact, in no quarter of the globe are they better represented than in North America. And of all the mammals that have been talked and written about, no single group has received one-tenth part the attention that foxes have. Apart from the tales of tradition, the history of foxes dates back to the day when printing presses first came into use—when history came to be a matter of printed record— and today the volumes devoted to this family would form a very extensive library. Several hundred books have been written upon the subject of fox hunting in Great Britain alone, and a similar literature is now coming into being in this country. Foxes have figured in the fables of every race of men on earth since the dawn of history, and even at the present writing they continue to be rung in by writers of every ilk in exemplification of all that is cunning, shrewd, sly, and artful in the ways of men and all other mammals. "Sly and cunning as a fox" is an expression common to the language of our race the world over. For example, take what the fox did out of the fables of Æsop and other writers of fables, and their works would be robbed of four-fifths their interest.



CUBS OF THE COMMON FOX

Figure 1. They are usually born early in the spring, being reared principally upon young rabbits, which are produced in numbers at the same season. This is a copied photograph by the writer after C. Reid, who obtained several negatives of this group.

These animals are, as an independent group, very distinct from the dogs, wolves, and jackals, and in general characterized by light, though well knit frames, erect ears, markedly pointed muzzles, and eyes of which the pupils contract to mere slit-like apertures in the daytime—much as we see it in the cats. The fur of a fox is very thick and its tail bushy. In some species the pelts are of great value commercially, and in all cases they are of more or less worth. In some the fur is almost black, in others white, and in still others silvery, a light red, gray, or brown.

We find large foxes in certain parts of Asia that are of a yellowish-red color—the Chinese and Japanese species being a light red—while in India we meet with the Bengal fox and the small species known as the Desert fox. The latter feeds upon grapes, and may have been the one responsible for the fable of the "Fox and the Grapes," though some say that it refers to those extraordinary little big-eared foxes of Africa called Fennecs that also eat grapes. The Fennecs are very elegant little creatures, one of them measuring only nine inches in length; their hearing is said to be most acute. The common fox (Vulpes vulgaris) of Europe is too well known to require any special description; it has figured in history ever since printing came into vogue, and is a remarkable animal, occurring not only in Europe but in Asia and Africa as well.

Coming to the foxes of North America, not a little has likewise been written about them; but we have yet a great deal to learn about their anatomy and habits. Zoologists have, as a rule, divided them into two genera —Vulpes and Urocyon. The true foxes are characterized by rather short bodies, short legs, and long tails that are bushy and more than half the length of the body. Their fur is long and soft; their erect ears of moderate length, while the muzzle is elongate and tapering.

Up to a few years ago there were some eight species recognized by zoologists; these are distributed over various regions of North America, Harriman's fox being found on Kadiak Island, Alaska; the common American fox from Canada to Georgia, westward to the plains. The

boreal species known as the Silver Fox and Long-tailed Fox are found in Nebraska, westward to California, and southward to Arizona and Oklahoma, and to these must be added the Hall Island fox, the Arctic fox (Fig. 7), the Great-eared fox of southern California, the Kit fox (Fig. 6), and the Nova Scotian and Newfoundland Red foxes—forms closely resembling the common species. These have all been described in various books, as well as the forms contained in the genus Urocyon, which are the "short-muzzle" foxes, further characterized by a concealed mane of stiffish hair down the dorsum of the tail—that is, not intermixed with the ordinary fur. Urocyon contains all the Gray foxes, as the Gray fox, and the Florida, Texas, California, Townsend's, Wisconsin, and the Dwarf Gray foxes.

The American Red fox is found in many localities from Canada to Georgia, and westward to the great plains. When it exhibits a dark cross on the back and shoulders, it is known as the Cross fox, and when the animal is all black with a white-tipped tail, it is called the Black fox. As has been shown, three well-known subspecies of the red fox are recognized, and they extend the genus over a large part of North America. Where these do not occur we meet with other distinct species, as the Newfoundland red fox in Newfoundland, and others.



THE SKULL OF OUR DESERT FOX

Figure 2. This is the left side view, designed to show the forms and placements of the teeth. Lower jaw detached. This specimen was collected in Arizona, and is here shown to invite attention to the close resemblance it bears to the skull of some species of dogs, examples of which are to be seen upon the streets every day.

At different times the writer has had opportunity to study a large number of these species and subspecies, in nature as well as in confinement, in regions where they were more or less abundant, and it has been noticed that foxes vary greatly. In England, where they have been chased for many generations, they have become so wily and cunning that it is no uncommon thing to have an old fellow completely outwit both men and hounds and make good his escape; this is especially true of the foxes in Leicestershire, which is the best fox-hunting country in all England. This fact is mentioned because of late our more experienced fox-hunters in New England have begun to notice the same change taking place in our red foxes. Having been hunted for many years past, they, too, are becoming better educated in the ways of hunters and hounds, and ere long they will, no doubt, be as good at getting away from their pursuers as are the foxes of England; in fact, no wild animals profit more successfully by their experience in the matter of avoiding danger than foxes do. Out West, years ago, the writer noticed that the foxes there had none of this educated caution and intelligence; their audacity and boldness was due to an utter lack of knowledge of their arch enemy, man, and not to a confidence in their power to escape him in critical situations. On one occasion he was out on foot hunting, and he carried a shot-gun loaded with heavy shot. Passing over the prairie and along the foothills, he came to place where there were several large burrows in the ground, and at the entrance to one of them stood three nearly full-grown long-tailed foxes. They stood there staring just as though they had never seen a man with a gun before. No New England fox would have done it—he would have been down the burrow in a minute. As it was, it went very much against the grain to fire upon them, but nevertheless two of their number fell to the writer's gun, while the third disappeared down the burrow as quick as a flash, unhurt.

At another time, the writer was out hunting rabbits in Fairfield County, Connecticut, with his youngest brother. A very heavy fall of snow was coming down, and there was already several inches of it on the ground. As the flakes were large and the wind was blowing, they were prevented from seeing objects at any great distance. In those days they owned an elegant St. Bernard dog, Bruno, who was very fond of going out hunting in a snowstorm. This was usually objected to, as Bruno knew no more about hunting than a woodchuck, and was often in the way; moreover, he conceived it to be his duty to commence violently barking at all sorts of critical moments. As they trudged along a narrow path by a piece of woods, the writer chanced to look back, when, lo and behold! there was an animal trotting coolly along after them, about forty feet in their rear. It was at once taken for Bruno, and they yelled at him to go home, which only had the effect of halting the newcomer, who stood looking at them in the most saucy manner imaginable. Then it flashed on them that the animal was not Bruno at all but a fox—and a splendid, red animal at that. But before they could say "bip" he was off and out of sight in the storm, at a rate that would have filled an old coyote with envy. His color had saved his life, as they certainly thought he was Bruno. This, it was learned afterwards, is an old trick of Reynard's, and frequently practiced by him to baffle his arch enemies—dogs and men. He is seldom caught at it, however, as he watches the hunter with the greatest keenness, literally keeping in his footsteps, knowing full well that it is the very last place he will be suspected of being in by his pursuer. He is ready instantly to put himself out of sight when in danger of being discovered.

Foxes were very common in the neighborhood of the writer's home in New Canaan, Connecticut, where a great deal of poultry was kept. They frequently raided the hen-roosts, and that with marked success. One old fox in particular lived with his family in a deep burrow in the middle of a meadow about a quarter of a mile from the barn; he had a special predilection for ducks, of which a good many were kept, and he seemed to know just when to come for them. At night, most of the ducks came home and remained in the big barn-yard, enclosed by a solid, high board-fence, where they thought themselves perfectly safe from any prowling marauder that might take it into his head to make a meal of one or more of them. In this, however, they were mistaken; for, upon one very dark night, nine half-grown ducklings were missing, and the tracks about the wet places in the yard plainly told the story of the fox's success in reaching them. How he got over the fence, or under it, the writer has never been able to understand. For a week he laid for him with a gun, then gave it up. Several nights after that he chanced to be at the barn one moonlit night, and, as luck would have it, without a gun. Low, gurgling noises caught his ear, which were evidently coming from a duck in deep distress; and, almost immediately, who should come trotting across his path in the moonlight but the old dog-fox, with the vixen following close at his heels. He had the biggest drake thrown cleverly over his shoulder, and was crunching on its neck in his efforts to quiet the sounds that had attracted the writer's attention. When they caught sight of him they were off at a great pace. Again the writer failed to make out how the fox had managed to enter the barnyard; but in any event he managed it, and the writer is convinced that the vixen stood outside on guard as he performed the operation. Over at the burrow next morning there were scattered all about the entrance brown, white, and green feathers—the indisputable and aggravating evidence of the fine feast they had enjoyed.

Old Reynard has been pursued on horse and with hounds in nearly every State east of the Mississippi, where he is found in sufficient numbers to render his hunting an object of sport. In New England and in the northeastern section generally it is considered legitimate to shoot the pursued fox at the finish, or during any part of the chase; while in Kentucky and Tennessee and other southern districts, such a practice is considered highly unsportsmanlike, and would subject the perpetrator to the severest criticism from every member of the guild. Strange as it may appear, it is nevertheless true that experienced old foxes, and those that have become familiar with the ways of men, horses, and hounds, seem to enjoy the fun quite as much as the hunters do. Frequently they have—and justly so—the utmost confidence in their powers to elude the hunters, and this they demonstrate upon numerous occasions. Then an old fox in the enjoyment of good health is more than a match, in a fair fight, for any average



COMMON RED FOX

Figure 3. He has unexpectedly come across a rabbit. Foxes, both old and young, are very fond of rabbits, and in the course of a year they capture and feed upon a great many of them.

hound—sometimes for two or three of them. It is only when run by packs in relay, exhausted by long chase, and overpowered by numbers, that he is vanquished.

There are those who believe that the red fox is not indigenous to this country, but that it was introduced here by the English during the early history of the Colonies. Certain it is that the red fox of Great Britain and the red fox of New England are very similar. In some sections the red fox is hunted in the snow in winter, and his schemes to avoid the hunters and the dogs at that season are quite as craftily laid as during the autumn. His pelt, however, when in prime condition, is always in demand, and furriers handle thousands of them as they handle the skins of other species of Vulpes. Unlike the gray fox which lives chiefly in hollow trunks of trees, the red fox prefers a good burrow for his home. Here, in the spring, the vixen brings forth her five or six young, and cares for them until they are old enough to shift for themselves. Besides such poultry as they capture, foxes are very fond of field mice and destroy thousands of them; in this way they are a positive benefit to the agriculturist. They also catch and eat many woodchucks—the latter standing in the utmost fear of them. Rabbits, some birds, game, rats, frogs, occasionally insects and fish, all come the way of old Reynard during the course of the season. It is rare that he is driven to partaking of carrion, though it sometimes happens.

To the best of the writer's recollection he has never seen a litter of very young cubs of the red fox, though they are not infrequently secured. They very closely resemble the whelps of the red fox of England, and a litter of these latter was most successfully photographed by C. Reid, published both in *Animal Life* and in *Living Animals of the World*. Through the courtesy of the publishers, we are permitted to reproduce one of these results here.

Another of the red fox's accomplishments is his ability to climb certain trees, where the inclination of the trunk and the accessibility of the lower limbs admit of it. His being able to perform this feat often saves his life, as does also his knowing how to swim. As a rule, he is not very fond of the water; and, in crossing a stream when undisturbed, he is careful not to wet his feet—if he can avoid it—by jumping from one dry stone to another.

Foxes are about at any time during the day or night, and one of them is just as likely to jump the feathered denizens of the barnyard at midday as under the cover of night, making off with his capture while the farmhands are at work in the meadows. If the weather be not very inclement, he prefers to sleep out in the open air, sheltered from the wind by some friendly rock or fallen tree. Often he will select the lee side of a hill for his snooze; moreover, he can detect the approach of a pack of hounds better under such conditions, although he is likely to do this under almost any circumstances, as his sense of hearing is remarkably acute, while his sense of sight is by no means poor.

His extreme cunning renders him a very dif-



PORTRAITS OF THE GRAY FOX

Figure 4. Mr. Herbert K. Job succeeded in obtaining this fine series of pictures of this widely known animal; they are from life, and show well the habit this species has of closing its eyes when subjected to any annoyance.



HUNTING THE RED FOX ON SKI IN NORWAY

Figure 5. This Norse boy has shot a Red Fox in the hills of his country, and is proudly exhibiting it. The photograph was made by the late Professor Robert Collett, of Christiania, curator of the Museum of Natural History in that city, and presented to the writer. The species very closely resembles our American Red Fox.

ficult animal to trap, especially in the case of foxes in the northeastern sections of the country, where they are becoming so knowing that they may steal the traps set for them some day, and use them on their own account to catch woodchucks with—thus gaining valuable time for play and for serious thought upon the subject of outwitting dogs and men. If by chance he is caught by the leg in a steel trap, a fox will free himself by biting off the leg—quite as readily as a coon or a muskrat does it.

Red foxes have a very strong odor that appears to be especially offensive to dogs; this is not so much the case with the gray fox, the latter being a tidier animal in some respects. The bark of the gray fox can readily be distinguished from that of the red one, being more husky, fainter, and thinner, and it is heard principally in the spring during the mating season. The red fox will, when occasion calls for it, give vent to a kind of high-pitched screech, that when heard at night, is quite awe-inspiring; and this is its purpose, as it often serves as a protection for its young.

Not very much has been written upon the life history of the Kit or Swift fox, the energies of most modern mammalogists apparently having been directed along other lines. Dr. John Strong Newberry says of this fox: "We had no opportunity of observing the animals in confinement, nor of testing by actual experiment the truth of the report which gives to this small, short-limbed fox such fabulous speed. All those who were familiar with them, however, agreed in saying that its swiftness has been greatly overrated; that it is even less swift than its congeners, the red and gray foxes; all of which the appearance and structure of the animal fully confirms."

The writer has seen the Kit fox a number of times in zoological gardens, but only a few times on the plains. That this species possesses remarkable powers of speed, when it has the opportunity to exert them on comparatively level country, there can be no question.

The Arctic fox is found in the boreal region of not only North America but of Europe and Asia as well; it is rarely found below the 50th parallel of latitude. This species was described by Linnæus as long ago as 1766, and possibly a few subspecific forms yet remain to be described by science. Professor Gibson says of it that "it is somewhat smaller than the European fox, its ears being less pointed and the muzzle shorter. The soles of its feet are densely furred, resembling those of a hare, hence its specific name, *lagopus*. As with many Arctic animals, the color of its fur changes with the season, being in most cases of a pure white color in winter, with the exception of a few black hairs at the extremity of the tail. Toward the end of April, when the Arctic snows begin to disappear, the long white fur gives place to shorter hair of a dark brown or sooty color. Occasionally a dark-colored fox may be seen in winter and a white one in summer, and in Iceland, according to Professor Newton, the winter coat differs very slightly from that



THE KIT OR SWIFT FOX

Figure 6. One of our smaller vulpine species, so named for its extreme swiftness when running. This is one of the most beautiful of all American foxes,, and by no means an easy one to capture.

of summer, probably owing to the comparatively mild character of the Icelandic winter. The Arctic fox has little of the proverbial cunning of its kind, having been seen to walk unsuspiciously into the trap which has been baited in its presence. It is an exceedingly cleanly animal, and the fætid odor, characteristic of the entire genus, is almost absent in this species. It differs also from the common fox in being gregarious, living, according to Richardson, in little villages consisting of twenty or thirty burrows placed near each other. The Arctic foxes seek their food, which consists of lemmings, birds, eggs, and carrion, at night, and their first impulse, says Captain Lyon, on securing it is to hide it, even though suffering severely from hunger. It was suggested, some years ago, by Professor Newton that this species supported itself during winter on a store of provisions laid up during summer, and captain Fielden was able during a polar expedition to confirm this. Even in Grinnell Land, he and his companions came upon Arctic foxes, and were greatly surprised on discovering numerous deposits of dead lemmings. 'In one nook,' says Captain Fielden, 'under a rock, we pulled out over fifty; we disturbed numerous caches of twenty or thirty, and the ground was honeycombed with holes, each of which contained several bodies of these little animals, a small quantity of earth being placed over them.' (A Voyage to the Polar Sea, by Captain Sir G. Nares.)"



THIS IS THE ARCTIC FOX OF AMERICAN BOREAL REGIONS

Figure 7. It is white in winter and bluish-gray in summer, and both pelages are here shown. This figure and the preceding one were copied by the writer from Professor St. George Mivart's great work on the canine species of the world, they being excellent likenesses of the living animals.

John Murdoch gives a short account of the Arctic fox in the Report of the International Polar Expedition to Point Barrow, Alaska, and he speaks especially of the great speed of this species when alarmed. "They seem almost to fly over the ground instead of running." A still better account than Murdoch's is to be found in Nelson's Report upon the Natural History collections made in Alaska between the years 1875 and 1881. Here the two color phases of the species are described as though they were two subspecies of the Arctic fox. They are spoken of as the "White Stone Fox" and the "Blue Stone Fox," although it is stated that the habits of the two forms are identical. Writers of the present, however, make no distinction between the blue and the white fox, having discovered that the two pelages are simply seasonal changes. Nelson found the "White Stone Fox" wonderfully abundant in some localities, it being resident in some places. This was the case along all of the belt of open country north from the peninsula of Alaska around all of the Behring Sea and Arctic shores of the territory. When connected by ice, they were also found upon the islands of the Behring Sea and those of the Behring Straits. They were found to be extremely numerous in all the open country lying between the Lower Yukon and Kuskoquim Rivers.

In support of the fact that Nelson and True took the "Blue Stone Fox" to be an entirely different form from the "White Stone Fox," they say in their account that "although the White Fox is unknown upon the Aleutian Islands, the Blue Fox is found throughout the chain, and also upon the Fur Seal Islands. On the latter it is very numerous; and as these foxes have a particularly fine fur, great care is exercised to kill any stray specimens of the White Fox that the ice may bring over over in the winter, and thus prevent any crossing between the two forms."

In summer, before the animals lose their pure white coats, they are very conspicuous, especially when they cross any dark area of ground. In winter, the very reverse of this is the case, and their snowy coats not only protect them against their arch enemy, the gray wolf, but gives them opportunity to stalk ptarmigan and other game almost unnoticed until the moment of capture. Around camps in winter they make their presence known by their feeble and querulous barking, and if hungry they will steal anything eatable they can get hold of, from game to snow-shoe thongs.

The Esquimaux trap a good many of the foxes with a "figure-of-four," or with steel traps. Thousands of their pelts have been sold in the English markets, and a good blue fox skin is a thing of great value at any time. "Blue foxes are bred and kept for the sake of

their fur on some of the islands in Behring Sea; they are fed on the seals killed on the neighboring islands, and are, like them, killed when their coat is in condition." (*Living Animals of the World.*) In short, the life-history of this little fox is extremely interesting. Stone and Cram, who appear to be of the opinion that there are several geographic forms of the Arctic Fox, relate of the species that in "summer they hunt for lemmings in the moss-grown tundras and barren grounds, digging them out of their holes, or pouncing on them as they traverse their runways in the thick, wet sphagnous beds that cover the swamps and boggy places. At this season



FEW EQUAL THIS FELLOW FOR SLYNESS

Figure 8. As pointed out in the text, the Swift or Kit foxes stand among the most interesting species we have in the fox family. This is the Big-eared one, and those familiar with the animal in the Southwest will never question its swiftness afoot.
(This figure, as well as Figures 9 and 10, were kindly loaned by the New York Zoological Society, and secured through the courtesy of Doctor Charles H. Townsend, Director of the New York Aquarium.)

the Arctic fox lives in luxury; for besides the lemmings there are numberless wild fowl nesting by the margin f every stream, and on the ridges willow grouse and snow bunting hide their eggs in the reindeer moss and low brushes, or in warm hollows where the short-lived blossoms of the northland crowd together in dense borders of bright colors. The lemmings are so numerous and easily caught that a very few hours each day spent in hunting would easily keep the fox supplied with meat.

"But the little, stub-nosed blue fox, though he lacks something of the wily shrewdness of the long-headed red fox of the woodland, is nevertheless a very intelligent beast. Knowing that summer will soon be over, the lemmings safe in their hidden runways beneath ice and snow, and the birds all driven north before the cold, he hunts diligently while game is yet abundant, and brings home load after load of fat-bodied lemmings, to be packed away in cold storage for the winter.

"Where the blue fox lives, the frost never wholly leaves the ground; so he digs down in the moist turf until he reaches a temperature only just above freezing, and packs down several dozen lemmings in a place, covering them with moss and sod. These caches of frozen lemmings are his principal food-supply for the greater part of the year."

Many of the habits of the grey fox are quite different when compared with those of the red fox. Where the gray fox is more or less abundant, the red one is scarce —and *vice versa*. They are opposed to each other in not a few respects, and in the long run the reds are the winners. The reasoning powers of the latter are finer; they are better plotters and schemers, and far more frequently plunder the poultry yards without paying penalty for it. Still, a gray fox is by no means a fool, and he has a number of physical advantages over his congeners; his inconspicuous gray pelt is an advantage to him, as is his smaller size. He can run quite as well, and is not so easily exhausted; moreover, the gray fox is a better tree-climber than the red, and so more frequently escapes in that way. His skin is not worth much, and therefore he is not especially hunted; and he



REYNARD OF THE CHASE. THE AMERICAN RED FOX

Figure 9. Foxes are, as a rule, not very tolerant of confinement, however regardful we may be of their welfare and comfort. This fellow does not appear to be having a very happy time, although entirely safe from hounds or gun, and all his wants well looked after.

will eat almost anything he meets with, from a mushroom to a quail. Then, being more or less of a southern species, his living is surer in the winter—and all this combines to favor his existence and perpetuation.

It is rare that one finds a gray fox living in a burrow—they much prefer hollow trees or stumps, or a long, hollow log stretched upon the ground. To such places they are often chased by the hounds, and in them they take refuge when it is stormy and the weather unfit for a sensible gray fox to be out in. When it is pleasant,

they follow the example of other species of foxes and take their naps in the open air, sheltered from sun, wind, and observation, among the bushes.

The vixen may have as many as five cubs at a birth, and these she rears in some hollow trunk, on a nest composed of dry leaves and other soft materials of the woods. When able to shift for themselves, they are taught in ways that are foxy by their maternal parent; but after a very little while, they are compelled to make their own living and take their own chances in life.

Years ago, old General Buford, of Kentucky, owned an elegant pack of fox-hounds, and there is a good story told about one of his fox hunts. This gives such an accurate account of some of the habits of the gray fox, and Bourbon counties, between which there was much good-natured rivalry, a young nephew of the General thought he would settle for good and all the mystery of the cunning, old gray's disappearance. From the unusually bold depredations, likewise from the various kinds of feathers around and about the cliff that had been plucked from the domestic poultry, it was pretty certain she had a litter of cubs somewhere near. So, on this day of the big hunt, Reggie Buford was on hand, concealed near the big oak and cliff, to solve the mystery. Promptly, on time, the packs started old "White-tail," for thus she was known because of a small white tuft of hair at the tip of her brush. She took the usual course, and gave the visiting and local packs a good run.



OUR GRAY FOX IS A WONDERFULLY HANDSOME ANIMAL AND FULL OF SPIRIT

Figure 10. We might almost imagine that this beautiful and intelligent species had grown gray in studying and comprehending the ways of men. It is hunted most unmercifully in all parts of the country, and the five here shown very well exhibit the characters of this species of fox.

that I take pleasure in repeating a few paragraphs of it. There was a gray fox which the General's pack invariably started in a ravine about three miles from the plantation-house where he resided. "This gray would run as long as it cared to, and then would disappear very near the place where it started and close to a high limestone cliff, near which there was a huge burr oak tree. The General was convinced that somehow this tree had something to do with the invariable disappearance of this cunning gray fox; but just how, or in what manner, he could not discern. The oak was certainly fifteen if not twenty feet from the cliff, near which the gray made her last appearance in a day's run.

"One day when there was about to be a field-day among the fox-hunting gentry of Woodford, Fayette, Then, thinking she had done enough to vindicate the hospitable spirit of sport in her native country, she started for her usual point of disappearance. Directly, Reggie Buford saw her coming in easy lope, swinging her tail from side to side, with the pack at least a third of a mile behind. She mounted the limestone cliff, and, stooping to give herself the necessary impetus, leaped for the body of the great burr-oak tree. She caught it just below the nethermost limbs, and nimbly climbed up the shaggy trunk to a distance of about sixty feet from the ground; there she entered a hole just large enough to admit her. Young Buford went home and told his uncle what he had seen.

" 'That tree's hollow,' ejaculated the General, 'I am sure of it. Tom, tomorrow morning you and Mose take

your axes and cut down that big burr-oak that stands close to the northwest line fence. And, Reggie, do you go along with them, and when the tree falls if the fox-den runs out from under the roots, have it dug out and capture the cubs. I want that den of foxes broken up, as we can never catch that old cunning vixen alive.'

The negroes willingly enough obeyed orders. After a quarter of an hour's chopping, down came the mighty oak. It was hollow for sixty feet from the ground upward, and there was a well-worn entrance to a den at the foot of the tree—the General's fox-hunting knowledge had stood him in good stead. The den ran off straight to the right for about fifteen feet, four or five feet under the ground, and terminated under the roots of a huge, yellow poplar, long dead, with its tall, spar-like trunk standing limbless in the air. It was no easy job to dig out this den of young foxes; it was evidently a very old one that had sheltered many generations of the vulpine kind. There were five cubs within it, just old enough to walk and to eat meat, for we found many chicken, turkey, and goose bones in the den, and what had been the thigh-bone of a lamb or kid—it was impossible to tell which. Of the young foxes three were males and two females. Two of the three males were as white as snow, the third was gray, and the other two gave evidence of being perfectly black when they had shed their first coat of hair, which they do at the same time they drop their milk teeth.

"General Buford did his best to bring all of this curiously marked den of foxes up to full maturity; but the white one, at about six months of age, took something like distemper in sporting dogs, and died. Another was accidentally killed by a horse stepping on it and breaking its back, and the third was found dead one morning in its pan. No visible cause for its sudden demise was apparent, so we simply had to put it down in the list of casualties, cause unknown. Thus was broken up one of the most famous fox-dens in central Kentucky."

No wild animal is more easily domesticated than the fox, either red or gray, and none exhibits so much sly cunning when tamed; but they are susceptible of a very high degree of affection for whoever has them in charge. The gray fox is one of the species we are most familiar with in the South; somehow we think it represents, in the highest degree, the lowest cunning and rascality of the fox race. Time after time we have heard well-authenticated instances of the gray fox pursuing and crawling after a covey of partridges, very much as a badly broken pointer would that had the hunting instinct, but had not been properly trained. Then, in audacity, the gray fox exceeds the red, for it will make its raid absolutely up to the barnyard, if it can thereby seize a fat hen or goose. The latter would seem to be its especial quarry—probably because the geese wander farther afield to the lakes and bayous that are around and about almost every plantation in the farther South.

Probably the habits of the Florida gray fox and other southern subspecies are quite similar to the species just described; they may differ a little, owing to the nature and conditions of their several environments; but it is not likely that these differences are very marked. The dwarf gray fox is the smallest animal of the family in North America—even smaller than the kit fox.

CHINESE FOREST TREE SEEDS AVAILABLE

A LIST of Chinese tree seeds which are available this year has been received from Mr. D. Y. Lin, of the College of Agriculture and Forestry of the University of Nanking, Nanking, China. The list contains quite a few new species for which orders will be taken up for the 1920 crop, subject, of course, to the usual conditions. Descriptions of these species can be found in Bailey's Encyclopedia of Horticulture. Inquiries for any other kinds of Chinese seeds will be welcome. The seed collection this year totals tons, the largest share of which will be demanded by forest nurseries managed by Chinese, and by extensive Chinese nurseries. The profits from the business are all devoted to the furthering of forestry in China.

Prices are quoted in gold, per pound:

Acer buergeranium	$.80
Acer trididum	.80
Aleurites cordata	.30
Camellia chinensis	.40
Castanea vulgaris, 1920—	
Cedrella sinensis	2.50
Celtis chinensis	.40
Cinnamanum camphora	.60
Dalbergia hupeana	1.00
Gingko biloba	.15
Gleditsia sinensis	.50
Juglans regia—var. sinensis	.15
Koelreuteria apiculata	1.00
Ligustrum lucidum	.10
Liquidambar formosana	1.50
Melia azederach	.20
Pistacia chinensis	.30
Pterocarya stenoptera	.40
Quercus, 1920—	
Sapium sebiferum	.20
Sophora japonica	.40
Sterculia plantanifolia	.30
Ulmus parvifolia	1.00
Zelkova acuminata	.60
Cryptomeria japonica	.75
Cunninghamia lanceolata	1.00
Pinus armandi	1.00
Pinus massoniana	.50
Thuya orientalis	.40

The prices quoted are for seed only. Parcel post costs 12 cents, gold, per pound, and parcels up to 50 pounds can be sent. All parcels are forwarded from the United States Postal Agency, Shanghai. Parcel post is usually cheaper than express, though they can be sent in care of the American Express Company, Shanghai, if desired. Four to eight weeks are required. A cost charge is made for bags and packing. Bills may be paid, when presented, to Mr. Russell Carter, Treasurer, University of Nanking, 156 Fifth Avenue, New York City, thus greatly simplifying accounting and payments.

All possible care is taken in the collecting and handling of seeds, as well as in packing and shipping, though of necessity we can not guarantee condition of seed upon arrival. Application for seed should be made to Mr. Lin, at Nanking, as above.

FOREST CONSERVATION BY BETTER UTILIZATION*

BY OVID M. BUTLER,

ASSISTANT DIRECTOR, UNITED STATES FOREST PRODUCTS LABORATORY

STRIPPED of ramifying and controversial details, the forest problem comes down to the need of providing timber to meet the forthcoming requirements of the wood-using industries of the country. There are two main lines along which that problem is to be met. One is by protecting the remaining forests and forest lands from fire and other natural destroying agencies and by bringing back to timber production cut-over forest land suitable chiefly for timber production. The other is by the conservation of the merchantable timber now standing by better utilization of the natural cut, or expressed in a different way, the curtailment of the annual drain upon the forests by more complete and scientific use of the trees cut. Concerted action in both directions is essential. Much has been written within the past twelve months about the ways and means of procedure under the first method and it has been the storm center of advocates of different forest policies. The second course has not been given as prominent mention or consideration as its remedial possibilities merit.

It is in connection with this latter phase of the subject that this statement has to do. But there is one point applying with equal force to forest production and forest conservation, which should first be mentioned because men whose business and financial interests are tied up in wood-using industries can well give it thought. A common reaction of the business man to the forest problem is that it is essentially a piece of uplift work for the benefit of future generations. That is not the case, especially if you will consider immediate benefits to be derived from possible accomplishments in the field of lumber conservation and utilization. Nor is it true of timber production. Great scarcity of timber supplies reacts upon the value of the established wood-using plants dependent upon those supplies. As the forest becomes more and more distant from the factory, there is a potential force at work pressing down the value of the plant and when the time arrives when it is necessary to depend upon the Pacific slope for timber to keep the factory in Pennsylvania or Indiana running, that force is going to register with somewhat of a shock.

Merely as an example, let us take the furniture industry at Grand Rapids established at a time when the forests were almost on the outskirts of the city. It has become the greatest furniture manufacturing point in the country but instead of millions of acres of forests immediately tributary, the State of Michigan today is practically cut out and one-third of its land is unproductive and a waste. The industries established when forests were close at hand are now drawing upon forests bordering the Gulf of Mexico. There are in the State of Michigan today ten million acres of unproductive forest land, which once bore the finest forests of the country. These lands are reverting to the State, for non-payment of taxes, at the rate of 3000 acres a month. Already over two million acres have thus gone into bankruptcy. I submit for your thought whether or not the value of those great furniture plants in and around Grand Rapids would be enhanced today by a good crop of merchantable timber growing on those lands.

But the timber is not there and it will be said the planting of those lands with young trees will be of benefit only to future generations. I believe that if all or a part of those lands were planted and were today supporting a young stand of thrifty trees,—a potential forest instead of a waste of brush and weeds—it would at once add stability to every plant investment originally underwritten by a once strong forest reserve insurance, which is now rapidly going into the hands of a receiver. It would enhance the credit strength of these plants, possibly not a great deal at once, but to an increasing amount as time goes on because when your plant must draw on supplies one to two thousand miles distant with all the intervening possibilities of transportation disruption, its sale or collateral value automatically shrinks.

Turning now to the question of better utilization of the timber which we cut each year: The man with a dollar in the bank can do infinitely more and do it quicker with that dollar than can the man who has first to earn his dollar. That is essentially the advantage, from the practical standpoint of getting results quickly, which those who direct their energies upon conservation have over those devoting themselves to timber production. It appeals to me that it is easier to make one tree which you have in hand do the work of two than to raise two trees of which the seed is not yet planted. This seems especially true when we consider that less than half of every tree cut in the forest is fully utilized. The Madison Section of the Society of American Foresters has been giving some study to the place of utilization in a national forest policy and the statistics which follow have in part been assembled by its forestry committee.

According to the best figures available, our present consumption of lumber is around 40 billion board feet. To put this amount of timber on the markets and in your factory requires the cutting in the woods of possibly 75 billion feet of standing timber. There is an inevitable waste between the tree and the market and it would be foolish to even speculate upon saving all of this waste under present economic conditions in most of our country, but there are places where it seems wholly feasible and practicable to bring about large savings and thus to relieve the drain upon the growing timber we have in hand. A few of these possibilities will be named,

* Presented at the organization meeting of the Association of Wood-Using Industries, held at Chicago, September 28, 1920.

more to suggest the profitable and practical field which lies ahead.

Since we are considering the general subject of making timber last longer, it is perhaps proper to mention first the possibilities of timber preservation. Of ties alone the railroad and electric lines of this country use approximately 120 million a year of which about 28 per cent are treated. The average life of a railroad tie properly treated is 15 years; of an untreated tie about 7½ years. If all ties were treated the average consumption would thus be reduced one-half or to 42½ million ties, a saving of over 1½ billion board feet. In its report of 1920 the Tie Committee of the American Railway Engineering Association estimates the saving would be somewhat greater or about two billion board feet.

Railroad ties, however, are not the only wood products subject to profitable preservative treatment. If we include in addition poles, posts, piles, mine props, shingles and lumber used under conditions much subject to decay, the annual saving by the application of efficient preservative practice would amount to some 6 billion board feet. It is too much to expect of human nature that every stick of timber which technically ought to be treated will be treated but it is within the realm of reason to save some 4 or 5 billion feet of timber by extending standard treating practice.

Segregating the secondary wood-using industries which can use large quantities of cut-up or dimension stock, it is found that their total consumption amounts to 8 or 9 billion feet. Deducting 25 per cent to cover the large dimension sizes bought in standard lumber dimensions, there remains some 5 or 6 billion feet of small dimension stock. For the most part this stock comes from standard lumber sizes and to that extent diverts standard lumber sizes from uses requiring standard dimensions. How much of this small dimension stock might be made up by closer utilization at the mills or by interchanged utilization among the wood-using industries it is impossible to say, but there is a great field here for conservation by developing a more intense manufacturing of slabs, edgings, crooked, small and defective logs now wasted. It has been estimated that all requirements for this small dimension stock could be met from timber now wasted. If that is the case it would reduce the present drain upon our forests some 5 or 6 billion feet.

The forest requirements of the paper industry of the United States amounts to some 6 million cords annually of which about 4 million cords are utilized by processes other than groundwood pulp. We are leaning on Canada for 20 per cent of this supply. The best utilization that has thus far been accomplished under chemical processes is 45 per cent of the wood substance. Thus for every cord of wood pulped by these processes some 55 per cent of the original weight of the wood is lost. In terms of our annual consumption of pulpwood this amounts to over 2 million cords. It is the usual practice for pulp mills to store their wood over considerable periods and recent investigations indicate that improper methods of storing result in an actual wood loss of 10 or 15 per cent in the weight of the wood. This means an annual loss to the industry and to the nation of 575,000 tons of pulpwood with a valuation of over $11,000,000. But the waste of pulpwood does not end here. The raw wood is converted into groundwood pulp, and much of it must necessarily be ground during periods of high water then held in storage. Infection with consequent decay is apt to occur causing a large annual loss estimated by the industry at $5,000,000 annually. Thus systematic studies to develop most efficient practices in this field, should further reduce the present drain upon our timber in hand.

It has been estimated that there is an annual loss exceeding one billion feet in the seasoning of lumber. While this may not be a complete loss in the sense that the lumber cannot be used, it is a drain upon higher quality material and contributes directly to the accumulation of low grade and less usable lumber. By the introduction of proper methods of kiln drying, it should be possible eventually to cut that loss in two. Similarly in the steam bending of material going into furniture, vehicles, etc., there is a large loss of high quality lumber much of which it would be possible to save by systematic studies and investigation to determine how various species can be bent with minimum loss. The great box industry using some four and a half billion feet of lumber annually, offers another field for relieving the annual drain upon our forests. This industry is already engaged in the development of boxes which will not contain more lumber than is necessary to serve the purpose. What saving would be possible in this field cannot, of course, be estimated but during the war boxes which were tested at the Forest Products Laboratory and then redesigned on lines of balanced construction showed savings in lumber ranging from 20 to 40 per cent. This, of course, is very much higher than would be shown for the average commercial box.

Every year our forest principal is being reduced uselessly by some 4 or 5 billion feet destroyed by fire and other natural agencies. This loss, of course, should be reduced to a minimum and while it possibly does not come under the category of conservation by better utilization, it is a source of loss that should have the active attention of every industry using or dependent upon wood.

There is undoubtedly a great volume of wood which goes into the waste heap at various wood-using factories which is subject to salvage through some sort of a wood-waste exchange or clearing house of information established by the industries themselves. This would lead unquestionably to much material, which is now scrapped, finding a market elsewhere. There are today many industries using grades of wood which are being burned as waste in other industries. This is due to ignorance of wood-using requirements and the lack of an effective medium by which different factories or industries may gain a clear idea of relative market requirements and the possibilities either of acquiring waste lumber from other industries or of disposing of their own waste to factories which can use it.

It would be possible to go on touching the various

(*Continued on page* 691)

WITH A PUBLISHER PRESIDENT EDITORS

EDITORS of the nation are expressing hopes that the next President of the United States will direct his efforts toward bringing about the adoption of a National Forest policy. The statement sent out by the American Forestry Association congratuating the country on the fact that the next President would be a publisher met with instant editorial response, some of which we can show in this issue. The Chicago *Tribune* devoted one of its editorial leads to the subject and this is on the cover of this magazine. The co-operation of the newspaper editors with the American Forestry Association is gathering momentum for the big drive that will follow the election. Some of the comment follows:

Sacremento Union: When the proper balance is struck by the discerning historian, who writes the annals of our present epoch, he will not fail to put the proper emphasis on the political recognition of our economic needs as embodied in legislation conserving the natural resources of the country.

Such a historian will find that such measures found scarcely any space in our statute books until near the dawn of the twentieth century. And he will find the presence of such laws coincident with the decline of our free land and the need for the intensive development of a settled country. Unless such a historian is also a philosophic student of human nature he will express great astonishment at the careless and prodigal wastage of our natural resources marking the first century of our development. It is not an exciting issue and it is certainly not political in any of its aspects, but if the next administration should adopt a sound and constructive program for the restoration of our forests its niche in the history of useful accomplishments would be indelibly secure.

Charles L. Pack, president of the American Forestry Association, pertinently points out that the next President will be a man who through his business connections will thoroughly appreciate the necessity of such a policy. Both the candidates have always secured their livelihood as newspapermen, and both are now active publishers. The present shortage of pulp wood for print paper is painful evidence of the shortage of timber now being faced by this continent.

Our depleted forests are now growing only one-fourth of the amount of timber annually consumed by the various industries which must have wood. The situation is not only critical, but absolutely hopeless unless the national government intervenes with a constructive program for reforestation.

Canton News: The next President of the United States can put his name in the hall of fame if he will "start something" looking towards a constructive policy in the conservation of forests, according to the opinion of Charles Lathrop Pack, president of the American Forestry Association.

Forest lands are being denuded of their timber, but nothing of a definite character is being done to insure that these forests will be restored for the use of future generations. In pioneer days the important thing was to strip the land of timber for agricultural purposes, and the nation knows how well it was done.

President Pack is hopeful that the next President of the United States will have a practical appreciation of the importance of a national policy that will conserve the timber that is left in the nation, and that he will urge upon Congress the necessity of action that will protect the remaining forests from devastation.

Great quantities of the softer woods, such as spruce, are used annually in the manufacture of wood pulp, a considerable part of which is converted into white paper for newspaper printing. The difficulty of getting this pulp is at present working serious hardship to many publishers and imposing heavy costs upon others.

Both Senator Harding and Governor Cox are newspaper publishers, and they are passing through the experience of practically every newspaper in the United States. Perhaps either of them will feel so strongly on the subject, if elected, that he will not be satisfied to delay the adoption of a conservation policy any longer than is necessary.

New York Commercial and Financial Chronicle: Now is the time of year when there are more persons in the forests for pleasure than at any other season. On this account there are more persons thinking of the forests than in ordinary times. Therefore this is the best of times to call attention to what is necessary to be done, and done without delay, if our forests are not soon to vanish from the earth. The gospel of forestry and reforestation is not a matter of times and seasons; it is for all times and all seasons. But in summer it ought to be easier to arouse interest in it.

Hence the call should be louder and more insistent than ever right now. Let us all resolve here and now to strive more vigorously than ever to save the forests we love so well, the forests that have sheltered us from the heat in our vacations, and given us some of the greatest pleasures of our lives. A program with this end in view has been outlined in the form of demands for action by national and state legislatures by the forestry committee of the American Paper and Pulp Association, and this has been indorsed by the AMERICAN FORESTRY Magazine.

Troy Record: Paper manufacturers and forest experts of the United States and Canada are meeting at a psychological moment in New London, New Hampshire, for discussion of forest protection. The matter of forest protection is always timely, but at this moment more than two hundred and fifty forest fires in the district south of the Campbell River in British Columbia have been reported. Scores of these are still raging, causing the destruction of thousands of feet of timber.

Speaking before the New London Conference, Charles Lathrop Pack, president of the American Forestry Association, declared that "our mature forests are not only being wiped out by destructive conflagrations as well as by numerous small fires, but these fires also prevent the natural reforestation of acres of cut-over lands." Forest protection is a very serious matter. Mr. Pack calls attention to the

POINTING A LESSON

Paterson (N. J.) Press Guardian

Perhaps no more unique memorial was erected to Abraham Lincoln than when John Finn of Decorah, Iowa, went into the woods and found a hackberry shoot which he transplanted in front of his home following the assassination of the President. The tree has been nominated for a place in the Hall of Fame for trees with a history which is being compiled by the American Forestry Association at Washington.

That tree teaches a powerful lesson as to what could be done toward correcting the forestry situation in this country. Fifty-five years seems a long time to look ahead but John Finn can span the years and span them quickly. There stands the tree, a towering lesson and a warning.

America must wake up and have forest crops just as the country has wheat and corn coming every year. The way to do that is to have an intelligent national forest policy.

SEE A NATIONAL FOREST POLICY

fact that lumber prices have jumped 300 per cent since 1914. Senator Harding likewise has noted this fact and pointed out the relation of an adequate national lumber supply to the housing problem. An inadequate lumber supply means higher lumber prices and consequently less building. Curtailment of building is detrimental to the American home as well as to the development of the American city.

The newsprint trade is also affected by the curtailment of the lumber supply. The Editor and Publisher, for example, says: "Figures compiled by the American Forestry Association reveal that the New England States are no longer self-supporting in a lumber way, that the Lake States, once our greatest producers of lumber are now importing to keep alive the many wood using industries in that section; that the supply of virgin pine in the South will be exhausted at the present rate of consumption in 15 years, and that the center of the lumber industry is rapidly moving to the Pacific Coast. This, of course, means longer hauls and higher freight. It means scarcer, dearer newsprint. It means scarcer, dearer lumber for every purpose. In reforestation lies the only salvation."

Fortunately not only Senator Harding but also Governor Cox have both recognized the essential need for a national program to restore the forest lands to productivity. Hence we may reasonably expect that the matter will be brought before the next session of Congress and an adequate forest policy perhaps formulated before the forests are so depleted as to cause serious embarrassment to the nation.

Portland Oregonian: The American Forestry Association shows in its official publication that there is a movement well under way to restore the timber of the country before it is too late. Reforestation, it is said, is actually under way. The story of the taming of every wilderness has been a story of waste indispensable under prevailing circumstances.

That events have a way of righting themselves is indicated by the reforestation campaign. It remains only to conduct it with the same energy that characterized the work of those early settlers to make good a great part of the loss within a measurable term of years.

Trenton (N. J.) Advertiser: Since it takes from 60 to 100 years to produce forest trees of commercial size, private owners of timberlands are not likely to be interested in forest reproduction as an investment, the American Forestry Association points out. The relationship of timbered areas to future needs; their incentive to tourist travel; the fact that they serve as water reservoirs, etc., make the public vitally interested in seeing them continued and for this reason state and national acquirement of logged-off areas and protection of such areas against fire is proposed as the solution of the continued timber supply problem.

Unless immediate forestry steps are taken —and taken in considerable magnitude—a serious situation will confront future generations. In fact, many boys and girls of today and some mature persons as well will live to see a time of embarrassment and distress unless radical moves are made to replace the trees that are now going so rapidly into the maw of manufacturing, the appetite of which grows with consumption and becomes all the more menacing as the supply decreases.

"THAT IS NOT ALL"

Rochester Democrat-Chronicle

Announcement is made that official indorsement of the New York State big tree competition, which is being conducted by the State College of Forestry, has been given by the American Forestry Association. In writing official approval of the idea, the Association secretary said: "This is a great stunt, this search for the biggest tree in New York State. The American Forestry Association has several claims for the largest tree from several states, and if you wish, we will enter the winner of the New York State competition in the national contest. We shall be very glad to co-operate with you, for we believe that the development of an interest in the individual tree does much to bring the public to appreciate the value of the forest, as a community of trees." The idea back of the competition is clearly expressed in these words. It would be a matter of interest to locate all the biggest trees of the State and from among them find the champion. But if that were all, it would hardly be worth while. Fortunately, it is not all, and the game, if it may be called that, is eminently worth the candle. The more the public can be induced to take an interest in trees, the better it will be for the forests, and so for the public.

Buffalo Commercial: Depletion of the forests of the United States within 60 to 75 years with a resultant slump in all enterprise that depends wholly, or in part on forest products can be averted if action is taken without further delay, says the American Forestry Association of Washington, D. C.

While at the present rate of cutting it is agreed that the forests of the United States are sufficient for only 60 to 75 years, it is pointed out by forestry experts that if private organizations adopt logging methods that will protect young growth and leave logged-off lands in condition for forest renewal, the young trees of today will be of merchantable size, when needed. This is dependent on keeping fires out of the forests so that young trees will have an opportunity to grow.

Rochester Post-Express: Forest fires are burning up a vast lot of the wood we so much need. This ought to get special attention for the plea which Charles Lathrop Pack, president of the American Forestry Association, makes for protection of timber areas against fire. Here in this state under the Conservation Commission's direction a start has been made at forest protection; there are not enough signal stations nor are they properly manned, but, inadequate as the service is, it has already safeguarded the state against severe forest fire loss. While we are proposing, arguing, propagandizing about replenishing our forests, about tree planting and wood conservation, we are allowing whole areas of good timber to burn up when a good protection service might prevent this. The common sense thing to do is to do everything possible to keep safely the timber supply that we have.

Milwaukee Sentinel: Charles Lathrop Pack, president of the American Forestry Association, in a recent statement, calls attention forcefully to the necessity for a constructive national forest policy, which, he asserts, is imperative if the complete denudation of American forests in the near future is to be avoided. Some impressive figures are cited by Mr. Pack, who points out that the virgin forests of the United States covered 822,000,000 acres and they are now shrunk to one-sixth that area. The relation of wooded areas to future needs of the country, their incentive to tourist travel; the fact that they serve as water reservoirs and many other reasons make it a matter of public interest to see that some methods of conservation that are intelligent and workable are arrived it.

It is matter of grave concern and its importance can not be too strongly urged on the people and the officials of the government. Under proper conditions the forest resources of the country can be made to last forever.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

MORGANTOWN, PA.

By Caernarvon Schools: Lieut. George H. Zellers.

PHILADELPHIA, PA.

By Boy Scouts of America, Troop 207: John P. Bartlett, Corp. Charles L. Beatty, Cornelius Boyle, Lieut. James V. Devenny, John J. Earner, William Hedges, Sgt. Paul Henkels, Edward Malone, Lt. William McGoohan, John Potterton, Capt. John J. Tuohey, Wm. J. Turner, James E. Murphy, Horace O'Donnell. By Women's Homeopathic Hospital: Dr. G. Walter H. Conrad.

SCRANTON, PA.

By Mr. and Mrs. E. E. Hollister: Charles M. Hollister. By Mrs. O. S. Clark: Daniel M. Clark, Mrs. Bena Erhardt, Ralph Miller. By Mrs. H. M. Wilcox: Lloyd G. Wilcox, Mrs. Rosa Seeley, Harold D. Seeley, Mrs. G. M. Dewey, Sgt. Theodore R. Dewey. By Mr. J. Lewis, Romaine Lewis. By Mr. and Mrs. W. S. Fessenden, Sgt. Guy A. Fessenden. By Scranton Bird Club and By Century Club: Eugenia C. Hosie. Mr. and Mrs. Arthur Warner, Clarence E. Warner. Mrs. Sara Curry, John W. Curry. Mr. Joseph Huss, Edward Huss. Mr. John Cawley, Peter Joseph Cawley. Mr. and Mrs. J. D. Peckham, Sgt. Homer L. Peckham. Mrs H. M. Hannah, Fred A. Hannah. Mr. and Mrs. J. T. Maloney, Martin J. Maloney. By Mrs. Catharine Hopkins, Corp. Leo. A. Hopkins. Mrs. Howell Harris, Corp. Walter W. Harris. Mrs. Ann Forkin, James A. Forkin. Mr. and Mrs. Samuel Roberts. David W. Roberts. Mrs. W. T. Parry, William T. Parry.

WARREN, PA.

By Memorial Park Committee: Sterling E. Rowland, Percy E. Lawson, Archie W. Westling, Rex. D. Walker, Fred Schwing, Axel T. Anderson, Ernest Anderson, Homer B. Eccles, Fred D. Mahaffey, Franklin L. Mattison, Elzie A. Lynch, Oliver J. Summerton, Robert Halcolm Eadie, Lieut. Donald D. McAlpine, Lieut. Stephen Paul Hoskins, Herman W. Hertzel, Stanley H. Smith, Henry H. Cumings, Leo Leosky, John H. Rylander, R. H. Carr, Floyd H. English, Glen Spetz, Sterl Atkins, Harry M. York, Clyde F. Jones, Ray C. Bines, George W. Neaves, John F. Spangler, Charles F. White, Louie J. Siefert, Stanley L. Wagner, Frederick L. Howard, Robert D. Shaw, Frank M. Glendenning, Robert B. Kilburn, Chester T. Sampson, Alfred T. Morrison, Garnet M. Noyes, Chester Munkegard, Oscar F. Johnson, Charles F. Swanson, Oran Kale, Edward F. Koebley, Wilbur Oleson, Carl A. Engdahl, John F. Cooke, Clyde F. Manwaring, James Uber, Clayton Skiff, William J. Clancy, Randall S. Houghton, Frank Burgland, Clarence P. Spetz, Ernest Crider, Richard E. Howard, Francis Nichols, Ralph H. Wood, William Van Ord, George W. Mead, Arthur Hagle, Claude H. Rahn, Robert B. Stuart, Clair Brady, Stanley E. Sutton, Rehl H. Carr, Harry Haley, Edward Ryberg, Frank Raisor, Henry W. Hallgren.

NASHVILLE, TENN.

By J. K. Raines' School: Mayor Gupton, Corp. A. N. White, James W. Turbeville, J. H. Bradford, Mrs. J. K. Raines, Clyde English, Mrs. G. H. Williams.

DALLAS, TEXAS

By Travis School: Wendell Spake. By O. M. Roberts School: Joe W. McNeill.

LYNCHBURG, VA.

By Lynchburg Chapter, D. A. R.; William Alexander, Samuel Marvin Arthur, Lonnie Joseph Bacon, Felix Longdale Banton, Lieut. Howard T. Barger, Col. Charles H. Blackford, Wm. Harrison Brooks, Joseph B. Brown, L. Harry Bryant, Lieut. Beverly J. Burks, Lieut. Robert Lewis Butler, Lieut. Herbert Butts, Lieut. Allen L. Campbell, W. Offutt Cobbs, Jacob Lorenzo Crist, Volney Eugene Cumbie, Lieut. G. B. J. Duval, Jr., Samuel Fallwell, Thos. Eugene Fallwell, Louis C. Fernald, Guy V. Finch, Lieut. Saunders Flemming, Harry Lee Foster, Ivan H. Fowler, Robert Franklin, William Gibson, Lieut. Geo. Preston Glenn, Fred Geo. Goephart, Marvin Gough, John Randolph Harmon, Robert Henry, W. W. Hillsman, Robinson Crusoe Johnson, John H. Johnston, Pannel Rucker Jones, Robert Lee Kessler, William G. Ketterer, Lieut. John Kirkpatrick, Jacob K. Klein, Haynard Kuck, George Lash, Charles L. Locker, Andrew J. Lucas, Robert L. Mayer, Robert A. Mays, Alexander Mier, Walter Mitchell, A. Marvin Moon, Sterns Moon, John J. Murphy, Lieut. Wm. O. Neubauer, Orlie L. Ore, Thomas Ore, Lieut. Reuben L. Paskiel, Richard W. Pendleton, Robert L. Perrow, Jr, Carrington Price, Geo. G. Printup, Jr., Ambrose B. Shenk, Eezer Snell, Jr., Robert B. Stamples, Carrington Stevens, Charles Evans Stone, Frank Hamilton Stone, W. Austin Thompson, Norman J. Traylor, Harry R. Walker, Clarence Widdifield, Major John H. Wills, Abner Odel Witt.

SEATTLE, WASH.

By University of Washington: Lawrence W. Allen, Jeannette V. Barrows, Alford J. Bradford, Leo F. Bennett, Donald Broxon, Herbert F. Canfield, A. E. Carlson, Lloyd H. Cochran, Dow R. Cope, Edward S. Cunningham, William R. Cutler, Walter C. Dunbar, James M. Eagleson, George Vernon Evans, Albert Morrill Farmer, Charles N. Fletcher, Samuel Goodlick, George F. Gorham, Rhodes H. Gustafson, Nicholis C. Healy, Clarence J. Hemphill, Alfred C. Hoiby, Everett Hoke, E. H. Hoisington, Frank H. Hubbard, Edward H. Hughes, Clair Kinney, Harry Leavitt, Wilfred Lewis, Charles A. Lindberry, John Martin, Adelbert D. McCleverty, William J. A. McDonald, Frank Everett McNett, Wilmot C. Morehouse, Roy Muncaster, Elmer J. Noble, Merle O'Rear, Samuel Parker, Gerald G. Patton, Lester D. Pickering, H. A. Ross, James R. Ristine, W. Earl Shanley, Truman S. Tucker, Homer W. Ward, Leon H. Wheeler, Harold C. White, Chester Wilson.

SOUTH BEND, WASH.

By Memorial Tree Committee: Walter Baltus, David G. Benton, Horace B. Dorrien, Walter Drissler, Don R. Grable, Werner J. Hill, William W. Hyatt, Victor H. Johnson, Dan C. Kelly, John A. Laako, Lewis Olof Larsen, Christian Moe, Henrick W. Niemi, Russel R. Owens, Howard Perkins, Alfred W. Petit, Tom Shelse, James C. Souter, Steiner Siverson, Jacob Teiseth, Thomas O. Williams, William Roy Willson, Joseph Zurfluh, Jacob Barger.

WHEELING, W. VA.

By Service Star Legion: Edward Tate.

FOND DU LAC, WIS.

By Woman's Club: World War Veterans.

LA CROSSE, WIS.

By Service Star Legion: Soldiers, Sailors and Nurses.

MIDDLETOWN, WIS.

By Middletown High School, Class of 1912: Franklin W. Haverland. By Middletown Women's Club: Harry T. Curwen. By Middletown Lodge F. A. M.: William C. Steckelberg. By Middletown I. O. O. F. No. 158: Berton O. Haak.

REFORESTATION, A PUBLIC, NOT A PRIVATE DUTY

"LUMBERMEN cannot be justly criticised for not replanting their lands," says Professor John Ise, in his recent book "The United States Forest Policy," published by Yale University Press. "Only under exceptional circumstances could it be done profitably. In the first place, an investment of this character would be a long-time investment. No return could ordinarily be expected in less than 50 years, in some cases even longer, and in the meantime the owner must pay taxes and protect his investment from fire and trespass. Although these two items—fire protection and taxes—are not large, they are too uncertain for a conservative investment. While fire protection is a small item usually, there is always a chance that fire may destroy a part of the entire investment. Taxes are likewise uncertain and arbitrary and, under the unscientific system prevailing in most states, must be paid regardless of whether the lands are bringing in any return or not.

"Even if there were no element of uncertainty, reforestation would seldom present an attractive field of investment The initial cost of reforesting, together with cost of protection and taxes, compounded annually for 50 years at six per cent, would amount to a very large sum, in all probability much more than the stumpage would then be worth. One writer on the subject has termed tree planting 'a risky six per cent investment.'"

THE PULP AND PAPER INDUSTRY*

BY GEORGE W. SISSON, JR.

PRESIDENT OF THE AMERICAN PULP AND PAPER ASSOCIATION

IT is no news that both this country and Canada have but recently awakened to the actual and critical situation that faces the pulp and paper industry. This realization has come as somewhat of a shock to many and to the general public who have in the past paid little or no attention to the matter so long as their needs were served. It would doubtless be true to say that the alarm over the pulpwood situation, while well founded, has been somewhat over-done so far as its psychological effect on the wood, the pulp and the paper market is concerned. It is no time for either the industry or the public to lose their heads, but rather to make a careful and honest survey of the situation and evolve from this study some policy that will, perhaps, not correct the trouble very soon, but through which the crisis can be tided over and an ultimate and permanent solution found within a reasonable length of time.

Pulp and paper manufactuirng is the one great industry using wood in which there is much hope for the practice of forestry as a commercial undertaking upon privately owned lands. Hence it is to the pulp and paper industry that professional foresters have turned most hopefully for the practical application of their principles and it is gratifying to note that many manufacturers of pulp and paper have excellently qualified foresters upon their staffs and are not only making special provisions to protect their timber lands from fire, but are engaging in planting operations with the definite purpose of providing a future supply of wood for their mills.

However, the insufficiency of private action and in a single wood using industry is readily apparent and the necessity for a nation-wide program embracing all phases of our forest resources and their utilization is clearly recognized.

It is with this thought in mind that the American Paper and Pulp Association, through its Committee on Forest Conservation, considered this matter. Our committee gave most painstaking and thorough study to the many phases of the question and submitted to our industry a preliminary report in November, 1919, following it with a most complete and definite report and recommendations for a National Forestry Policy with suggestions for legislation, both State and Federal, to make the plans effective. These reports met with surprisingly favorable comment the country over. They deal in a sane and effective manner with the fundamental principles involved in the solution of the problem of so handling the forests of this country that they will support properly the industries dependent upon them. I venture to say that up to that time no more careful and exhaustive study of this matter had been made and certainly no more well considered and actually practical plans that should unite all interests had ever been presented.

Briefly summarized the program calls for:

Permanent annual Federal appropriations to be expended directly and in co-operation with the several States for the adequate protection, management and reproduction of existing forests and the planting of treeless areas; complete and accurate forest surveys and land classifications; a consistent and continuing policy of public acquirement of forest areas on watersheds of navigable streams and of other areas suitable only for timber growing wherever best adapted to State or Federal management; the extension of general authority to the Secretary of Agriculture to exchange National Forest Land or stumpage for private timbered or cut-over land within or adjacent to National Forests; and a broad policy of forest research and investigation.

In addition to such Federal action our committee recommended such State legislation as would embody policies harmonizing with those suggested for the Federal Government but applicable to the special needs of the several States.

Bills covering the principal features of this program are now being prepared for introduction in the National Congress and State Legislatures and it is the confident hope that this truly constructive program will be made effective very shortly.

I shall not attempt to discuss the possibilities of pulp and paper development in new regions like Alaska or other locations where recent investigations have been conducted, as our immediate problem is that of serving an already established industry and meeting the emergency in localities where we thoroughly believe steps can be taken to perpetuate those industries and guarantee the continued existence of prosperous industrial centers which are the homes of busy and happy American which are the homes of busy and happy American citizens.

In the northeastern States, where the pulp and paper industry is concentrated to a degree found in no other section of an equal area and where the forests had been heavily overcut for many years in the lumber industry even before the paper mills began to take their toll, there are perhaps more pressing reasons for some immediate or early form of relief if the industry is to continue. It is certain that within this area the industry cannot operate at full capacity without the importation of a large percentage of its wood, and the condition of the forests demands immediate attention in the direction of a program of protection and reforestation, from which permanent relief can be expected.

It is a fundamental economic principle in the life of a nation that all land must be made as productive as its character will permit and that the land that produces a crop of timber, though it will be once in 25 or even 50

years, is as deserving of the consideration and help of the State as is the land that produces its annual crop of foodstuffs and which receives, and properly so, the solicitous care of our Government.

While this program, both State and National, may hold out hope for the future in making permanent the industries utilizing forest products, it would be futile and holding out false hopes if the general public were led to believe that the present actual shortage in pulp and paper products could be easily and quickly relieved. Whatever steps are taken, whether temporary, or forward-looking, there will inevitably be necessity for economy in the use of paper, and the publishers and users of paper will display not only regard for the public welfare, but intelligent selfishness so far as their own interests are concerned, if they will co-operate in a movement to avoid waste in every manner that will not jeopardize their real service to the general public.

I can speak for the industry which I represent in this country in promising the hearty co-operation and practical help of the industry to all bodies and agencies that are approaching this subject in the same spirit as I have outlined.

No consideration of the pulpwood supply for American mills would be complete unless note were taken of the Canadian situation from which source large quantities of this raw material have come in the past and are still coming. The growing realization by Canada that her own pulpwood resources are not unlimited must be her excuse for not only prohibiting the export of unmanufactured pulpwood from Crown Lands, but to seriously suggest an embargo on wood from private lands also. I have no intention of entering into discussion of the merits of this situation other than to quote from my own remarks at the last convention of the American Pulp and Paper Association:

"The markets of America have been freely opened to the products of Canadian mills and the industry there owes its phenomenal development to that fact. It is further true that Canadian industry must have American coal of which several million tons annually are sent across the line. There should be no clashing of interests through misapprehension, but full recognition of the similarity of the problem on both sides. Co-operation on a large and magnanimous scale and in the most sympathetic spirit must be the rule if the industry is to prosper in both countries. Common fairness indicates that access to raw materials needed should not be denied on either side, and a restrictive policy in excess of what is fairly necessary for national requirements is not in accord with the co-operative spirit which must hereafter rule in international relations."

It is unfortunate indeed that some in Canada should have so misinterpreted the spirit in which the Americans have taken up this question and particularly that certain financial interests have given currency to statements that appear to question the motives and the business ethics of the Americans who even attempt to discuss the situation in a fair and dispassionate way. If those who are more interested in the financial exploitation of the industry than in its practical building up and operation would leave the adjustment of this matter to the actual manufacturers of pulp and paper in both countries, such adjustment to be brought about by amicable business conferences, it is my opinion that some arrangement mutually satisfactory and mutually helpful could be worked out. America does not desire to rob Canada of her birthright in her pulpwood resources and no suggestion of retaliation was ever intended in the fair statement that both countries needed raw materials which are produced or exist in the other country, and that arrangements for interchange of such resources should be upon some fair plan of co-operation that would be helpful to industry on both sides of the line.

I venture to commend for most careful consideration the very practical suggestions offered by Colonel Graves as to a conference by qualified representatives of the United States and Canada and to congratulate myself that, to use the words of a noted personage, my mind has seemed to "go along" with his as to the desirability of an amicable business-like conference, undertaken in a spirit of co-operation and good will.

Speaking for the manufacturers of pulp and paper, let me give assurance of our entire readiness to assume obligation and render full measure of service in the practical execution of a program that will be continent-wide in its scope, all-embracing as to wood-using industries and dedicated in its last analysis to the permanent service of all the people.

* Extracts from an address at the New England Forestry Conference in August, 1920.

FOREST RECREATION—THE MIGHTY ROCKY MOUNTAIN TROUT

(*Continued from page* 664)

dollars will build and equip very nicely a small hatchery where from four to five hundred thousand fish may be hatched annually. I would favor the construction of a great number of hatcheries in our mountains rather than just a few large ones. By this method a great deal can be saved in transportation of eggs and hatch, and each locality would be in a position to better know just how many fish can be taken and supported. If the whole United States goes fishing, and certainly it should, we will need these hatcheries by thousands. I will venture the statement that every mountain stream in the United States will need have several traps and one hatchery sufficiently large to handle all the fish trapped on the drainage.

Next summer when you come to the mountains for that trout, remember his struggle for existence, his innocence, his value, and let not one be wasted. Remember, if you are fortunate enough to camp within one of the National Forests, that there are a number of brown skinned men who know nothing of an eight-hour day working, perhaps within a few miles of you, who will willingly tell you more of your playground and the denizens of stream and forest.

MAPLE SUGAR IN COLONIAL TIMES

BY LAURENCE R. GROSE

DEPARTMENT OE FORESTRY, BATES_COLLEGE

IN THESE times of sugar shortage, we read with especial interest certain remarks on maple sugar that come down to us from Tench Coxe, worthy citizen of Philadelphia in Revolutionary times. Coxe was a patriot, an amateur political economist, but above all a promoter; and the enterprise he was promoting was nothing less than the United States of America, in the cause of whose prosperity he turned his ready pen to account. It is in the pages of his "View of the United States" (Philadelphia, 1794) that we come across his "estimate of the capacity of sugar maple lands of Pennsylvania and New York to supply the demand of the United States for sugar and molasses.

"The information of William Cooper, Esquire, of Cooperstown," says he, in developing his estimate, "is that there are easily made from a tree five pounds weight of sugar, and that there are fifty trees on an acre at a medium; but suppose only four pounds to be produced by a tree and forty trees on an acre,—and supposing the whole demand of the Union, 42,084,140 pounds, then 263,000 acres will yield a supply for the United States. It need not be observed that there are very many more than 263,000 acres of sugar maple lands in each of the eight following counties: (in New York) Albany, Montgomery, Otsego, Tyoga, Ontario; and (in Pennsylvania) Northampton, Luzerne, and Northumberland. Also that the sugar maple tree is found in many other parts of those two states, and of the United States.

"It will be frankly admitted that the result of the above estimate has a wild and visionary appearance; but as it is made upon facts, very carefully ascertained, and as the whole calculation is exposed to examination, it will not be unreasonable to give some faith to it, until exaggeration of fact or error shall be pointed out."

This was in 1790. A year or two later, Coxe satisfied himself that the total consumption of sugar and molasses in the United States was 26,000,000 pounds. "It is certain," he writes, "that every farmer having one hundred acres of sugar maple land, in a state of ordinary American improvement (that is, one-third covered with judicious reserves of wood and timber, and two-thirds cleared for culture of grass and grain), can make one thousand pounds weight of sugar with only his necessary farming and kitchen utensils, if his family consists of a man, a woman and a child of ten years, including himself. It would therefore require the attention of 26,000 of such small families occupying (at one hundred acres each) 2,600,000 acres of those lands to make (at 1,000 pounds each) 26,000,000 of pounds, or a quantity of sugar equal to all the molasses and sugar, annually consumed in substance in the United States. The operation in a family is as easy as to make household soap or cheese, or to brew ale or beer, and as there is in this country much more than twice the above quantity of sugar maple land, in situations not too southern, the only object that requires attention is to give, as fast as possible, generality to this simple, profitable, and comfortable manufacture." And he adds that the people of Pennsylvania had already paid considerable attention to the possibilities of this manufacture, especially since "the great and increasing dislike to negro slavery, and to the African trade among the people of that state, occasioned this new prospect of obtaining a sugar, not made by the unhappy blacks, to be particularly interesting to them."

In writing so of maple sugar, Coxe was doubtless adopting information and suggestion from Benjamin Rush, a famous Philadelphia surgeon and chemist, whose own calculations with respect to sugar, as expounded in 1791 in an open letter to "Thomas Jefferson, Esq., Secretary of State of the United States, and one of the Vice-Presidents of the American Philosophical Society," had led him to the following eloquence of prophesy: "In contemplating the present opening prospects in human affairs, I am led to expect that a material share of the happiness which Heaven seems to have prepared for a part of mankind will be derived from the manufactory and general use of maple sugar, for the benefits which I flatter myself are to result from it, will not be confined to our country. They will I hope extend themselves to the interests of humanity in the West Indies. With this view of the subject of this letter, I cannot help contemplating a sugar maple tree with a species of affection and even veneration, for I have persuaded myself to behold in it the happy means of rendering the commerce and slavery of our African brethren in the sugar Islands as unnecessary, as it has always been inhuman and unjust." Dr. Rush's letter was rightly enough addressed to Jefferson, who was known to permit the use of maple sugar alone in his household, and who even planted maples on his Virginia farm with sugar harvesting in view.

It is scarcely necessary to say that these early visions of the coming importance of maple sugar never took the shape of realities. As a source of general supply, maple sugar has never been more than a good big drop in the American sugar bucket. Yet in countless pioneer families this native sweetening was in sole and daily use; and each year since, many millions of pounds have been made.

To the settlers and to the Indians, maple sugar was an everyday matter; but to the early travelers, in search of gossip or information to retail to their eager and curious fellow-Europeans, this product was invariably a cause of wonder and remark. A long list might be made of those whose tales of journeying in America referred to the tree and its useful sap. Yet, strange to say, no one of these early references makes it clear beyond doubt

whether the Indians or the white men first discovered the uses to which the sap might be put.

The earliest reference yet discovered is of date 1684, and appeared in England in the "Philosophical Transactions of the Royal Society" as "an account of a sort of sugar made of the juice of the maple in Canada." "The savages of Canada," it reads, "in the time that the sap rises in the maple, make an incision in the tree, by which it runs out; and after they have evaporated eight pounds of the liquor there remains one pound as sweet and as much sugar as that which is got out of the canes. The savages here have practiced this art longer than any now living among them can remember." If the proverbially long memory of the red man be taken into account, this statement points certainly toward Indian priority in the use of maple sap.

It is true, in any event, that at an early date in our observation of them, the Indians made habitual use of maple sap products, as sauce, as sugar, or as beverage. Said the Baron de la Hontan, in writing of his travels in America in 1684-95, as an English translation of 1703 gives it, "The maple tree yields a sap which has a much pleasanter taste than the best lemonade or cherry-water, and makes the wholesomest drink in the world. This liquor is drawn by cutting the tree two inches deep in the wood, the cut being run sloping to the length of ten or twelve inches. At the lower end of this gash, a knife is thrust into the tree slopingly, so that the water running along the cut or gash, as through a gutter, and falling upon the knife that lies across the channel, runs out upon the knife, which has vessels plac'd underneath to receive it. Some trees will yield five or six bottles of this water a day; and some inhabitants of Canada, might draw twenty hogshead of it in one day, if they would thus cut and notch all the maples of their respective plantations. The gash do's no harm to the tree. Of this sap they make sugar and syrup which is so valuable that there can't be a better remedy for fortifying the stomach. 'Tis but few of the inhabitants that have the patience to make maple-water, for as common and usual things are always slighted, so there's scarce any body but children that give themselves the trouble of gashing these trees."

According to an Algonkian legend, had it not been for the interference of the immortals, we should have had syrup and not thin drinkable sap direct from the tree. "One day," this legend runs, "Nokomis, the grandmother of Manabush, was in the forest and accidentally cut the bark of a tree. Seeing that a thick syrup exuded from the cut, she put her finger to the substance, and upon tasting it found it to be very sweet and agreeable. She then gave some of it to her grandson, Manabush, who liked it very much, but thought that if the syrup ran from the trees in such a state it would cause idleness among the women. He then told Nokomis that in order to give his aunts employment and keep them from idleness he would dilute the thick sap. Whereupon he took up a vessel of water and poured it over the tops of the trees, and thus reduced the sap to its present consistency. This is why the women have to boil down the sap to make syrup."

The Indians knew and used two means of reducing the sap to syrup. One was to freeze the sap partly, and throw away the frozen portion, which was little more than plain water; the other was to boil the sap down, in whatever way they could devise. According to Lieutenent-Colonel Graham, in his sketch of Vermont published in 1797, "the method pursued by the Aborigines in making this article was as follows: Large troughs were made out of the pine tree, sufficient to contain a thousand gallons or upwards; the young Indians collected the sap into these troughs, the women in the meantime (for the men consider everything but war and hunting as beneath their dignity) made large fires for heating the stones necessary for the process; when these were fit for their purpose, they plunged them into the sap in the troughs, and continued the operation till they had boiled the sugar down to the consistence they wished." He adds: "There are two kinds of the maple tree, from which sap is taken. One, the black, or hard maple; the other the white, or soft maple; the former makes infinitely the best grained and best flavored sugar, and fully equal in quality to the best Muscovado."

The sugar once made, the Indians used it in a variety of ways. They mixed it with melted bear's fat to make a sauce to dip their roasted venison in; they sweetened their boiled corn with it; they combined it with powdered parched sweet corn to make a light ration, a few spoonfuls of which, softened with spring water, sufficed for a meal on long journeys; or they used it by itself as an emergency ration,—thus proving themselves forerunners of the "Chocolate Soldier." Certain tribes would scarcely have known how to get along without their *aninatik sinzĭpakwat* (maple tree sugar). In fact, the Iroquois called the Algonkians *ratirontaks*—"tree-eaters"—because of their dependence on maple sugar.

Had there been a shortage of white sugar in colonial days, the Hoover of that time would have had no difficulty in finding a way out. Even now, there is no reason why the sugar maple should not bear a loyal share in food conservation.

The Indiana State Board of Forestry has issued a bulletin urging an increased output. This bulletin says: The high price of sugar and the necessary conservation of the supply are sufficient reasons for us to make as much maple sugar and syrup this year as possible. In 1900 Indiana produced 179,576 gallons of maple syrup, while Ohio produced five times as much. In 1910 Indiana produced 273,728 gallons and 33,419 pounds of sugar, the equivalent of 850,000 pounds of sugar. There are reasons to believe that Indiana could easily double her output, which means a production of a million and a half pounds of sugar, if the owners of small numbers of trees would tap them. The statistics available give the average production of sap as 20 gallons per tree, and it takes about 40 gallons of sap to make a gallon of syrup. It is to be remembered that the flow of sap and the sugar-

content varies as to year and the time of the season it is produced. The sap can be gathered in wooden or galvanized buckets. The latter with covers are considered the best. As soon as you can estimate the number of buckets and spiles you will need, your order should be placed for them in order to be sure they can be had when needed.

The producer of maple syrup usually gets from $1.50 to $1.75 per gallon for his product. At the present price of sugar, no doubt the price next year will be greatly increased. The profit of the industry depends upon the amount of help that must be hired. If one who has a sugar orchard is not busy during the period of syrup production and has home help sufficient to run a camp, the making of maple syrup is profitable. We have a report from one man who tapped 175 trees which made 75 gallons of syrup, which he sold for over a hundred dollars.

Now it is the duty of every one who has sugar trees to make sugar or syrup this year, for this would do much to relieve the sugar famine. If you cannot tap your own trees, possibly a neighbor would be glad to do so. It is not an infrequent thing to haul maple syrup several miles; thus one operator could work all the small woods in his neighborhood. The injury to trees from tapping is negligible. If you have sugar trees and cannot work them this year yourself, do not wait for some one to come to you to ask to work them. Get busy and hunt up some one who would be willing to work them on shares. Remember that "sugar" will not only catch flies, but without it we couldn't have caught "the Kaiser."

FEDERAL LEGISLATION NEEDED

FOLLOWING are salient points from the very fair, moderate and well formulated recommendations of the Forest Service to the United States Senate with reference to desirable forest legislation.

1. Co-operation with States in Fire Protection, Forest Renewal and Classification of Lands as between timber production and agriculture with initial annual appropriation of not less than $1,000,000 expendable in co-operation with the States.

2. Extension and Consolidation of Federal Forest Holdings, continuing the purchase of forest or cut-over lands with annual appropriation of at least $2,000,000.

3. The Reforestation of Denuded Federal Lands, to be completed in not more than twenty years, this being most urgent on denuded watersheds.

4. A study of Forest Taxation and Insurance with devising of model laws on forest taxation, co-operation with State agencies in promoting their adoption and development of forest insurance.

5. Survey and Classification of Forest Resources to determine the present volume and production of each class of timber in every important forest region, and ascertain the requirements, as to quantity and character of timber, of each state and of every important wood-using industry.

6. Current Appropriations for Forest Research to maintain Experiment Stations in all the principal forested regions of the United States.—*The Lumber Bulletin.*

FOREST CONSERVATION BY BETTER UTILIZATION

(*Continued from page* 683)

industries which promise possiblities of developing better utilization. If a general survey could be made of the wood-using industries sufficient to bring together an intelligent and analytical summary of utilization possibilities and if this summary were stripped to what appears sanely practicable, we all would undoubtedly be somewhat staggered at the opportunities lying at our very doors. In the few instances cited a saving of well over 10 billion feet was indicated, but assume that in the whole field the most that could be hoped for by good business utilization amounts to 10 billion feet annually.

That would mean 10 billion feet of ripe timber saved each year. It would save one year's supply every fourth year. It would prolong by 25 per cent the timber reserve —the forest insurance assets—of the wood-using industries. To accomplish that by planting new forests and growing new timber will require annually almost half a million acres, a cash outlay of some 10 million dollars followed by 80 to 100 years of upkeep and protection. Furthermore, in the working out of the forest problem, the most critical times will come in the period between the exhaustion of the present forests and the maturity of new forests. The possible saving annually of 10 billion feet of timber on the stump is worth looking into and the wood dependent industry that doesn't see it is blind to its own interests and to its opportunities.

Without minimizing in any degree the importance of forest production, the field of conservation by better utilization stands out therefore as an intensely practical means of accomplishing immediate results in reducing the drain upon the timber we already have—timber produced in the course of hundreds of years of growth and renewable only in the same way. Immediate steps towards forest production are needed to provide timber for the future; conservation by better utilization accompanied by adequate forest protection is needed to keep timber behind your factories and to bridge the critical gap of an intervening shortage which already impends.

This organization now in process of formation has before it this great field of possibilities for service to itself and to its customers—the public. Once thoroughly organized with all wood-using industries represented, the field could be critically and intelligently surveyed and a definite program drawn along those lines promising greatest return. That program will necessarily be one of research—research in the sense of collecting and co-ordinating information which although now available is so widely disseminated as to prevent intelligent and constructive application and research of the more intensive kind which seeks to yield new information needed in developing the most productive measures of conservation by better utilization.

COX FOR A FOREST POLICY

A STATEMENT BY GOVERNOR JAMES M. COX OF OHIO, DEMOCRATIC CANDIDATE FOR PRESIDENT, ON THE NEED OF A NATIONAL FOREST POLICY FOR THE PERPETUATION OF OUR FOREST RESOURCES

"THE proclamation by President Wilson of Fire Prevention Day, October 9, brought before the country, in a striking way, the necessity of conserving the nation's resources, which is one of the greatest internal questions of the country. Millions of dollars are invested in business dependent on forest products. Our forest fire bill is $30,000,000 annually. The mounting cost of print paper and lumber is enormous.

"The report of the Forest Service, in response to the Senate resolution calling for information on forest depletion, discloses facts that must bring to every one a realizing sense of the great importance and necessity for conserving our forest resources. There are now in the United States, this report shows, 81,000,000 acres of waste forest land, devastated by cutting and by fires. Nothing of value is growing on these lands, or likely to grow without a huge expenditure for reforestation. Besides this we have an area of comparatively unproductive second-growth forest three times as great as the waste land area. Each year we cut off 5,500,000 acres and burn on the average no less than 9,400,000 acres.

"And the destruction proceeds. Of the vast primeval forest that constituted so considerable a part of the great natural wealth of our country, only two-fifths remain, and this remainder is being consumed four times faster than it is being replaced.

"The conservation of our timber resources involves the two-fold consideration of replacement and protection. We have been neglectful in both respects.

"There are 315,000,000 acres of state and privately owned forest lands in the United States, in the protection of which the Government should co-operate. Half of this vast area at present is wholly without protection, according to estimates of the American Forestry Association, and the other half is protected but inadequately. If these lands are to be kept productive, there must be greater and more efficient efforts by the Federal Government, the states and private owners in the direction of fire protection.

"Many industries have been unable to obtain their supplies of timber at any price. In other industries the output has been reduced by as much as fifty per cent. Anything that adversely affects the lumber and wood-using industries of the country naturally reacts to the disadvantage of consumers. The Lake States, once the center of the lumber industry, now pay millions of dollars in freight rates on lumber to keep their wood-using industries going, and the center of the lumber industry is moving toward the Pacific Coast.

"The movement upward of wholesale prices on upper grades of soft wood lumber in one state through a period of years is illustrative of what confronts other states as a consequence of a neglectful policy of conservation. In New York these prices were from $20 to $25 per 1,000 feet prior to 1865, when mills in the state supplied the market; between 1865 and 1917, when most of the supply came from the Lake States and the South, the price had advanced to from $35 to $45. These prices are now entering a general level of $130 per 1,000 feet, with a large part of the material coming from the Pacific Coast.

"Seventy-five per cent of the difficulties confronting us in the task of keeping our forest lands productive will be overcome by adequate fire protection of our forest lands. The necessity of fire protection, not alone for the manufactured products but for the source of the raw materials of these products, can hardly be overemphasized and should be kept always prominently before the nation. Action is requisite to the solution of conservation problems and it is one of the things I will strive for early if elected."

BRITAIN PLANTS AMERICAN TREE SEED

ADVICES received from British forestry officials regarding the distribution of the forest tree seed which was presented to England last year by the American Forestry Association show that the seeds have been sown in nurseries managed by the English Forestry Commission. One hundred and sixty pounds, or almost all of the Douglas fir seed sent to England, was sent to Ireland, where the climate seems to be particularly favorable to its growth. When the young trees have attained sufficient size, they will be planted out in the forests which the Commissioners are establishing in various parts of the United Kingdom. The Secretary of the Commission writes of their appreciation and says: "They will be of real assistance in helping to increase our timber resources, which were so greatly depleted for war purposes."

PORTUGESE APPRECIATION OF TREES

In many places where timber trees are to be found in Portugal, one sees the following inscription—in woods, parks and gardens:

To The Wayfarer.

Ye who pass by and would raise your hand against me, hearken ere you harm me.

I am the heat of your hearth on the cold winter nights, the friendly shade screening you from the summer sun, and my fruits are refreshing draughts quenching your thirst as you journey on.

I am the beam that holds your house, the board of your table, the bed on which you lie, and the timber that builds your boat.

I am the handle of your hoe, the door of your homestead, the wood of your cradle, and the shell of your coffin.

I am the bread of kindness and the flower of beauty.

Ye who pass by, listen to my prayer: harm me not.

Douglas Fir
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YOU have heard men say that good lumber is scarce. They say that lumber isn't what it used to be, and that we must soon come to use substitute materials.

Do you know how much good lumber there is in this country today? With the possible exception of the hardwoods, there is as much good lumber available for construction purposes as there ever was at any time since America became a nation.

There is more standing timber today in the United States than ever was made into lumber since the Pilgrims landed on Plymouth Rock.

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As substantial factors in the lumber business, the Weyerhaeuser people wish to render real service to you and to everyone who uses lumber.

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To this end we will supply to lumber dealers and to the public any desired information as to the qualities of different species and the best wood for a given purpose.

This service will be as broad and impartial as we know how to make it. We are not partisans of any particular species of wood. We advise the best lumber for the purpose, whether it is a kind we handle or not.

What we advocate is conservation and economy through the use of the right wood in its proper place.

If we could insure your getting the wood you ought to have, it might mean a difference of years in the life and service of the lumber—fifty years, perhaps, as against a few months. So important is the selection of the right wood or grade of wood for a given use.

From now on the Weyerhaeuser Forest Products trade-mark will be plainly stamped on their product. You can see it for yourself at the lumber yard or on the job after it is delivered.

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DOMESTIC EXPORT

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

IT is interesting to note the increasing use of aircraft in forestry work. Besides the two Canadian companies operating their own fleets, one of two seaplanes and the other of three, the Air Board in co-operation with the Department of Lands and Forests of Quebec, has established a station on Lake St. John and will patrol for forest fires and take photographs of unexplored country. The same work will be done in British Columbia in co-operation with the Forestry Branch. A flight to determine roughly the areas in western Quebec and eastern Ontario infested with the spruce bud-worm was made by the Air Board, carrying representatives of the Entomological Branch of the Commission of Conservation. A flight has also been made from Cochrane to James Bay and moving pictures were taken of the country passed over, the time occupied by the flight being about two and one-half hours. It will now only be a short time before we shall have reconnaissance maps of eastern Canada which will show conclusively where our timber lies and of what species it consists.

An interesting study is being carried out jointly by Price Brothers and Company and the Laurentide Company. The former have had made a contour map of fifty square miles of timberland and from this constructed a relief map or model, showing the types and quantities of timber, drainage, contours, etc. The Laurentide Company is taking photographs of this same territory which will be built up into a mosaic which can be studied in conjunction with the model. Interesting results are expected

Photographs of many different types of country and timber have been taken by the Laurentide Air Service, many showing pure stands of white and jack pine, spruce, etc. To add to the collection, the Lord Lovat, K. T., K. C. M. G., D. S. O., Chairman of the British Forestry Commission, is arranging to have the British Air Service take photographs of pure stands of oak, larch, Douglas fir, Sitka spruce, Corsican and Scots pine and also typical English forests.

The Quebec Forest Service has arranged to send four forestry students to Europe, some to Scandinavia and some to France to study foreign methods. The appropriation for the Forest Service will also be increased.

A long step in forestry progress has been made in Ontario by the appointment of E. J. Zavitz, Chief Forester to the position of head of the Woods and Forest Branch. Heretofore the work of timber sales, superintending cuttings, etc., was under a non-technical man, leaving the Chief Forester only the fire protection and nursery work. All forestry matters will now come under him. This will bring Ontario into line with the other Provinces, and good results are looked for.

Hon. Dr. E. A. Smith, Minister of Lands and Forests of New Brunswick, has resigned, due to a difference of opinion between himself and his colleagues as to the new stumpage dues and the location of a game preserve. This is lamentable, as Doctor Smith organized the present Forestry Department, which is a model organization, and under it the revenue from the forests has increased markedly.

This season the white spruce has seeded heavily for the first time since 1917, and much seed has been collected. The Province of New Brunswick collected 1,000 bushels and the Laurentide Company, Ltd., 600 bushels.

The Brown Corporation of Berlin, New Hampshire, have plans for a nursery which will enable them to plant five trees for every one they cut. This should point the way to other American companies whose pulpwood supplies are running low.

Mr. A. D. Otty has been engaged as Forester by the reorganized Dryden Pulp and Paper Company of Dryden, Ontario.

The meeting of the Pacific Logging Congress was held this year in Vancouver, October 6, 7, 8 and 9th.

Lord Glentanar, of Glen Tanar, Aberdeenshire, Scotland, was recently in Canada. He owns a large forest property and has the misfortune to have had the only disastrous forest fire in Scotland for nearly one hundred years. Twelve hundred acres of forest were burnt. The fire was probably caused by carelessness and burnt for a long time, owing to the character of the soil. Before returning to Scotland, Lord Glentanar purchased a gasoline forest fire pump and hose for use in case of emergencies.

Professor Leslie, of Aberdeen University, Scotland, is at present studying forestry conditions in Canada, and gives the following account of the planting activities of the British Forestry Commission along nursery lines in that section. In the Craibstone, about five miles from Aberdeen, in 1918, 800,000 seedlings were grown and planted out in areas acquired by the Commission. In 1919, 2,000,000 seedlings were lifted and transplanted. Last spring, 2,000,000 seedlings were transplanted. These were mostly Scots Pine, larch and Sitka spruce. In the spring of 1919, extensive sowings were made in the Improvement

Park and in the Woodlands Field nurseries. Woodlands Field now has 1,300,000 spruce and 1,000,000 larch two year seedlings and the Improvement Park 5,000,000 larch, 4,800,000 Scots pine, 1,000,000 Japanese larch, 1,500,000 Sitka spruce, 100,000 American white spruce, 1,500,000 Douglas fir and 10,000 Austrian pine. Double the above quantities were sowed this spring.

The Laurentide Company, Ltd., is cutting one thousand cords of hardwood to be used in the manufacture of ground wood pulp. The species being cut are poplar, white birch, yellow birch and maple. The two first will be floated and the two latter will be transported in barges.

The following is interesting: Representations having been made to the Queensland Government that the export of large quantities of softwoods—hoop pine and bunya—from the state, principally to the other states of the Commonwealth, had created a serious shortage of pine in Queensland and at the same time had the effect of causing increased prices, a proclamation has been issued which will have the effect of seizing all logs arriving within 25 miles of Brisbane or Maryborough, and owners of such logs will have to apply to the Government before same can be exported.

STATE NEWS

MINNESOTA

MORE than $375,000 will be derived from the sale of stumpage from state school and swamp lands this year as a result of the cuttings completed during the 1919-1920 logging season, according to the state auditor.

The money derived from the sale of this stumpage is paid into the state trust funds, the majority being credited to the swamp lands fund and the balance into the school fund of the state, both of which are included in the trust fund.

The amount of timber stumpage cut in the season recently closed, falls a trifle short of that cut in previous seasons, because of the labor shortage and the early snowfalls which hampered the work of cutting in woods and swamps in the northern part of the state, according to Otto Diercks, superintendent of the land and timber department in the office of Auditor Preus.

The prices received for stumpage during the past season have been more than doubled over those received during the past four years, and the market at this time commands up to $15 per thousand feet on pine stumpage; on spruce stumpage the state receives up to $10 the thousand feet. Ties are sold for up to 25 cents each and cedar posts are sold at the rate of three cents each. Cedar poles command a price of from 30 to 40 cents each.

The approximate value of timber remaining to be cut on state lands during the next decade of years is estimated at from $10,000,000 to $15,000,000, according to Mr. Diercks.

NORTH CAROLINA

IN connection with the approach of the fall fire season, the Forestry Division of the North Caroina Geological and Economic Survey announced that it succeeded in securing the services of an experienced forester who will devote practically his whole time to the prevention of forest fires in North Carolina.

Mr. William D. Clark, the new Assistant Forester, comes from New England, where fire prevention has been developed to a science, and is a graduate of the Yale School of Forestry, probably the leading institute of its kind in America. Mr. Clark combines the enthusiasm of the North with the tact and courtesy of the South, which eminently fits him for dealing with the varied problems which are inevitably connected with the work of fire prevention.

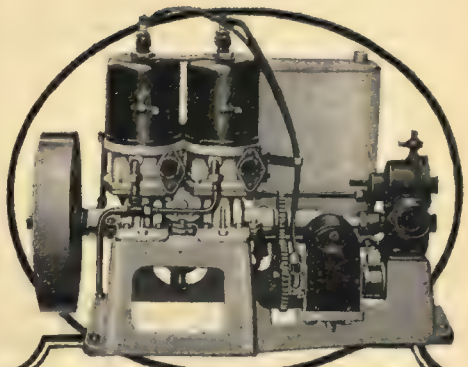
The Federal Government has for the past few years been contributing from two to three thousand dollars a year towards forest protection in North Carolina, and the State has been spending a somewhat greater amount. Satisfactory results have been secured on certain restricted areas, but the funds have been sadly inadequate. Congress will this winter be asked to greatly increase its appropriation, so that at least $10,000 will be available for fire protection in this State.

The work of extending and making more effective this forest fire prevention will be largely left to Mr. Clark, who will do the work of a State Forest Fire Warden.

OREGON

GOVERNOR OLCOTT, of Oregon, has appointed a committee to look into possibilities of preserving tree growth along highways of the state. The subject has recently received considerable attention in the press of Oregon, but is by no means a new subject. It has been up locally in many sections of Oregon and Washington and probably in other northwestern states also. The public takes kindly to the idea of having highways bounded by forest trees which it has taken 300 years to grow. There is every reason why this should be the case for timber lands freshly cut or burned over are unsightly.

But there are other sides to the question also. Narrow strips of timber, except in very sheltered places, will not be wind



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firm and leaving such strips to blow down can only result in loss and an unsightly tangle along the highway.

Then again, there is the even more serious obstacle of acquiring the land and timber. A strip of timber 200 or 300 feet wide and ten miles long on each side of a highway would represent even at very low stumpage rates, a value of quite a few thousand dollars and there are many ten mile strips it would be desirable to have lined with trees.

Obviously the state or county could not expect an owner to donate to the community a considerable amount of timber on which he has paid taxes, protected against fire and against which many other charges have been piled up over a series of years. Just as obviously the state probably could not invest a large sum in timber along highways for, as stated, unless conditions were unusual a large part of it would probably blow down.

It is believed that everything possible consistent with sound public policy should be done to preserve the beauty of highways. But it is thought too that this can best be done by working out a careful plan with this in view. Such a plan Governor Olcott's committee will doubtless present in due time. One thing is certain; if fire is kept out of cut-over land for a few years sufficient young growth will come in so that it is no longer unpleasant to look at. This will doubtless be the solution along many miles of highway. Groups of wind firm trees or even individual wind firm trees can possibly also be found along certain stretches of road to form a nucleus for future forests.

The problem is an interesting and important one and like all important problems will take time to work out in the best interests of the public and with proper regard for property rights.—*The Forest Patrolman.*

"A fresh memorial, as each year
New life and buds and leaves appear.
A living monumental tree
True type of immortality."

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BOOK REVIEWS

"Modern Pulp and Paper Making, A Practical Treatise," by G. S. Witham, Sr. Published by The Chemical Catalog Company, New York, N. Y.

This book is a comprehensive account of pulp and paper manufacture from the sawmill to the finished product. It is perhaps of particular significance because it is the first really complete, non-technical description of the pulp and paper industry as it is conducted in America. The industry has developed along quite different lines here from what it has in Europe, so that the European literature on the subject has been inadequate, even for those who could read it, to give any clear idea of just how pulp and paper are made in this country. Mr. Witham's book therefore meets a distinct need.

The publication is, as its title indicates, a "practical" one. While enough of the theory of pulp and paper making is given to furnish a background for the study of specific processes and methods, there are no learned discussions of the rather complex chemistry involved. Some of the simpler chemical reactions are explained, but the reader who wishes to probe deeper is referred to scientific works along this line and particularly to Griffin's and Little's "Chemistry of Paper Making."

The book is intended primarily for the practical paper maker. It is, therefore, simply written and no attempt is made to discuss the history of paper making, to go into details regarding the chemistry involved, or to describe every piece of equipment ever used in the industry. It does, however, contain a strikingly complete description of the various processes by which pulp and paper are made and the equipment used. A chapter is devoted to the personnel of a pulp and paper concern, in which the necessity for co-operation among the employes and between the employes and the management is strongly emphasized. Many tables and other useful information are included, and practically the only thing lacking to make the work complete is a bibliography of other literature on the subject.

Taken all in all, the book is an excellent one which should fill a long-felt want. It will undoubtedly prove useful not only to the practical paper maker, for whom it is primarily intended, but also to many technical men not intimately in touch with the industry who desire to know the salient facts concerning it.

"NORTH American Forest Research," compiled by the Committee on American Forest Research, Society of American Foresters. Published by the National Research Council, Washington, D. C. Price, $2.00.

This bulletin contains, by individual projects, a compact statement of all the forest research now being conducted in North America. It covers the entire field of forestry, including not only such subjects as dendrology, silviculture, forest mensuration, forest protection, and forest management, but also investigations in forest products, forest pathology, forest entomology, and grazing. The bulk of the work is naturally being handled by the United States Forest Service. The extent of the studies being conducted by States, educational institutions, and private interests will, however, be a source of surprise to those who have not kept in close touch with the progress of forest research in North America.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
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Tales from the X-Bar Horse Camp. By Will C. Barnes, Breeders' Gazette Press, Chicago, Illinois. $2.50.

Fresh from the press, this collection of stories by Will Barnes, of the Forest Service, will make instant and lasting appeal to every lover of the great Western country. They are cracking good tales of the camp and trail and the beautiful photographic illustrations add greatly to the personality and charm of the book.

The History of Cuba. Published by B. F. Buck & Company, New York, in five volumes.

This is the only history of Cuba that has been written in any language in any way approximating the full scope of the theme A reviewer has said that it is more than a history of Cuba—it is a prelude to the history of the United States, of the American continents, of the Western Hemisphere. It antedates all other American history, since Cuba was the first land reached by Columbus the identity of which was never in dispute, and all histories of the Western world perforce begin with Cuba. It was here that Columbus made his first exploration of lands in the Western Hemisphere. It was because of Cuba that Ojeda and Enisco planted colonies upon the South American continent and that Balboa discovered the Pacific and Pizarro conquered Peru. It was from Cuba that Cortez proceeded to the conquest of Mexico, and that De Sota planted colonies in Florida and discovered the Mississippi River; and finally in Cuba the rivalry between Spain and England for American mastery was fought to a finish. This history sets forth for the first time in its fulness the story of Cuba's rise from a colony to a nation, a story of which even Cubans themselves know little and the rest of the world almost nothing, but which in its bewildering wealth of legendary lore, of tradition, of authentic romance, adventure, heroism, comedy and tragedy ranks well with that of any land of earth. It tells for the first it portrays finally the resources of the island, its potentialities, its opportunities, its beauties and charms, its political, social and intellectual life. It proves unquestionably how well worth while it will be to cultivate the acquaintance of Cuba—the "Queen of the Antilles" and to improve the unsurpassed opportunities which she offers to the investor, the colonist, the commerce of the world as well as to the traveler in quest of health, pleasure, delightful climate, wonderful scenery and all that one of the most richly endowed lands of the world can give. Dr. Willis Fletcher Johnson, the distinguished professor of the History of Foreign Relations in New York University, and recognized as one of the most interesting and authoritative historical writers in American literature is the principal author and editor of the entire work.

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FOREST SCHOOL NOTES

BATES COLLEGE, MAINE

PRACTICAL work in forestry, in the 14,000 acres in York County held by Bates College, is to be a feature of the course which the college is offering students for preparation for graduate schools of forestry, for information in a general way and to fit men to take subordinate positions in the lumbering business and other woods industries, in paper and pulp mills, in the state forestry service as guards or rangers, or as managers of private tracts of timberland.

"Maine has a wonderful opportunity to develop her forests," said Professor Bernard E. Leete, assistant professor of forestry, "for the land is naturally hilly and rocky in many places and on such farms the owner might well have done better, in years gone by, had he whittled and waited in the back yard, instead of trying to clear the land of the trees. The latter, grown to maturity and properly lumbered would have netted him larger returns than the meager crops such soil could produce. Trees require only quarter the salts and other chemicals which garden crops require and they can be grown on steep slopes otherwise difficult to till.

"Maine, already as a state, has developed a wonderfully effective system of fire protection; and now it seems to me that the time is at hand when much can be accomplished in practical forestry. It is high time that New England took the second step that will insure permanent woodlands. Intensive forestry, such as is practiced in Europe, will be the last step—yet some distance in the future. The prospects seem bright to me for this line of work in this part of the country."

UNIVERSITY OF CALIFORNIA FORESTRY SCHOOL

WHEN classes assembled on the opening day, August 17, it was announced to us that we were facing the largest enrollment in history (over 9,000) and that facilities in many departments of the University would be strained to the breaking point in accomodating the students. The forestry division is fortunate in having sufficient elbow and breathing space as its growth in enrollment has been steady but not phenomenal. Forty-one students are majoring in forestry and the Forestry Club is looking forward to an active year.

On August 25, Professor W. L. Jepson gave an illustrated lecture on the redwoods of California, under the auspices of the Forestry Club. The large hall was crowded and it was evident that a majority of the auditors were convinced that the "Save the Redwoods League" is doing a splendid work in its effort to preserve a number of choice redwood areas as national or state parks.

Professor Walter Mulford, who is acting Dean of the College of Agriculture this year in the absence in Europe of Dean Hunt, welcomed old and new members of the Forestry Club at his home on the evening of September 1. These meetings by his cozy fireside are an annual event, greatly enjoyed by all members of the club.

The summer camp this year was a decided success from every point of view, eleven men being in attendance for the course of thirteen weeks. The camp site, near Meadow Valley on the Plumas National Forest, is a spot of rare charm and beauty, the influence of which is reflected in the pride and care the boys took in making the camp a model of neatness and comfort. Professor Metcalf opened the camp and conducted the work in use of instruments and laying out primary control lines. Professor Bruce followed with work in mensuration, growth and logging studies, while Professor Fritz took the class to various saw mills in the vicinity. It was a great summer for all concerned, and by no means the least enjoyable parts of it were the excellent fishing to be had near camp, the daily visits to the "ol' swimmin' hole" and long evenings spent around the blazing camp fire.

After completing his work at summer camp, Professor Metcalf took a short leave of absence from the university and conducted a timber survey in the Selkirk Mountains for the Canadian Pacific Railway.

During the early part of the summer, Professor Fritz spent several weeks in a study of sawmill conditions in the redwood region.

Professor Bruce has just returned from a visit to the logging operations of the Weed Lumber Company, where Blair and Sharp, graduates of last May are being introduced to the practical side of the lumber business. From all accounts, both men are making good with a vengeance.

We are all looking forward to the return in December of Professor D. T. Mason, who has been on leave of absence for nearly two years, as Timber Valuation Expert with the Treasury Department in Washington.

The Forestry Club at its meeting September 15, selected committees for the year and discussed plans for the meeting of the Intercollegiate Association of Forestry Clubs to be held here early in 1921. It is hoped by the committee in charge that a joint meeting may be arranged for the delegates, supervisors of District V, United States Forest Service, and the California section of the Society of American Foresters.

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COLORADO AGRICULTURAL COLLEGE, DEPARTMENT OF FORESTRY

A COURSE is being offered for the first time by the Forestry Department of the Colorado Agricultural College for the preparation of forest rangers. This course will be offered in the "School of Agriculture," which is of secondary grade, corresponding to an agricultural high school, or as preparatory to entrance to the Agricultural College.

The "School" is conducted by the College, and the most of the teachers are college faculty members. The Ranger Course requires three years and makes optional a six weeks summer course in forestry practice. Two courses in forestry are offered each semester, or twelve forestry courses during the complete period of three years.

It has been the experience of the Forest Service in Colorado that 90 per cent of Forest rangers leave the Service within a ten-year period to enter usually some ranching or agricultural work. Forest rangers are commonly young men who later enter other vocations, but they perform a wonderful public service. Meagre pay by the Government causes the most of them to enter more remunerative fields.

The object of the Ranger Course is to fit young Coloradoans for effective work as rangers, and for their later work as agriculturists when they shall have served a number of years as rangers. The College is also progressing satisfactorily with its higher or professional forestry instruction.

NEW YORK STATE COLLEGE OF FORESTRY AT SYRACUSE

CHARLES E. SIFFERLEN, of Brooklyn, a graduate of the New York State College of Forestry, who went to the Yale Forest School for his graduate work, has been named instructor in forest engineering at the New York State College of Forestry at Syracuse, filling the vacancy caused by the resignation of Oliver M. Porter to become Assistant Secretary of The American Paper and Pulp Association. He will report for duty at once, and his first work will be the taking charge of field work of the sophomore class of the college. He was with the forest engineers in France, and was later in Canada for an American paper company.

Another shift in college circles was the securing of J. Elton Lodewick, a recent graduate of Syracuse, by the University of Maine, as instructor in dendrology and forest pathology in the biology department. Mr. Lodewick graduated at Syracuse in 1919, received his master's degree last spring, and has since then been assisting Dr. Harry P. Brown, of the technology department, in research work.

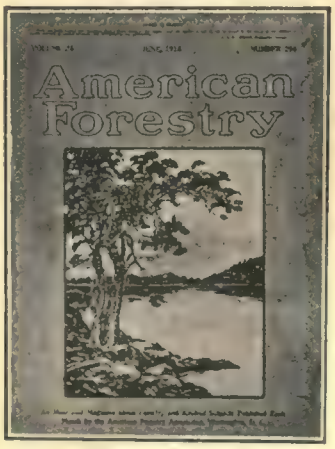
The summer camp of the college on Cranberry Lake has been the most largely attended in the history of the college, for not only the summer camp has been engaged with the sophomores, but a special camp under special instructors, has been conducted for others interested in forest problems during the entire summer.

Special work in study of forest insects has been done by several New York State College of Forestry faculty men and research men from other states, in the college forest insectary.

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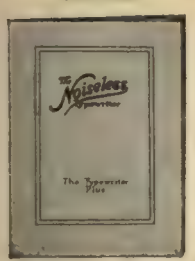
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RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C.

GRADUATE of the Ranger Course of the Lincoln Memorial University, Harrogate, Tennessee, wishes to secure work as a forest ranger or guard. Twenty-four years old. Address Box 965, care American Forestry, Washington, D. C. (11-1-21)

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C.

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MAN WANTED with technical training and practical experience sufficient to make him thoroughly competent as a developer of Park plans, and also Park Superintendent—both in road construction, planting and landscape work—and Director of Forestry Service upon the public streets and parks of the city. Address Box 910, American Forestry Magazine, Washington, D. C. (6-9-20)

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SMOKERS URGED TO USE CARE IN THE WOODS

AS a basis for securing co-operation of tobacco users in the reduction of losses from forest fires, the Forest Service of the United States Department of Agriculture is gathering information as to the extent to which fires in the woods are due to smokers.

"We have been gathering statistics for a number of years as to the causes of forest fires," said Acting Forester Sherman recently in outlining the plan, "but these statistics have not shown under a separate heading fires known to have their origin in tobacco smoking. All fires started by hunters and fishermen, for example, are commonly classed as campers' fires; those started by loggers, to lumbermen; and so on. From now on our men in the field making reports will be asked to indicate, so far as they are able, how many fires are started by smokers.

"A burning cigarette end seems such a small matter that relatively few people trouble to be sure that it is out before tossing it away. In the western national forests, where in the summer every spark of fire is particularly dangerous on account of the dryness of the vegetation, our forest rangers have again and again traced fires back to the point of origin and found there a cigarette butt, from which the fire had spread fan-wise down the wind. Some of these cigarette butts lay by the roadside where they had been tossed from the cars of automobilists.

"Lumber companies sometimes forbid smoking in the woods. Restrictive measures of this character would not be called for if smokers had a sufficiently keen sense of responsibility, and the habit of care not to drop fire in any form."

The Secretary of Agriculture addressed a letter, to a number of leading tobacco manufacturers not long ago, pointing out that smokers cause many forest fires, that a single fire may cost the Government thousands of dollars for fire fighting, to say nothing of the timber burned up and the landscape desolated, and that by enclosing in tobacco packages some sort of warning against carelessness with fire, the companies could materially aid in the campaign for forest protection. One of the largest tobacco companies in the country answered favorably and requested a suggestion for a slip which might be placed in packages of smoking tobacco, as a warning. The department suggested a legend reading:

> CARELESS SMOKERS CAUSE MANY FOREST FIRES,
> says the United States Forest Service.
> BURNED TIMBER PAYS NO WAGES!
> asks your help to prevent fires.
> Be sure your match, pipe ashes, cigarette are out before you let them fall.

FOREST RANGER EXAMINATION

IN order to fill vacancies in the ranger force of the Forest Service, the United States Civil Service Commission announced an open competitive examination for forest ranger on October 25. In Arizona the examination was held at Clifton, Flagstaff, Prescott, Roosevelt, Safford, Snowflake, Springerville, Tuscon, and Williams, and in New Mexico at Alamogordo, Albuquerque, Magdalena, Santa Fe, Silver City, and Taos. Persons desiring to take such examinations should secure application Form 1312 from the Civil Service Commission, Washington, D. C., from the Forest Supervisor at any of the examination places above mentioned, or from the District Forester, Albuquerque, New Mexico.

"AMERICAN FORESTRY, in my opinion, is going ahead faster than almost any magazine I know of. I have found it this year of very great value in my administration of this park. You are certainly to be congratulated upon the beauty of the magazine, as well as upon the quality of its articles and editorials."

HORACE M. ALBRIGHT,
Superintendent of the Yellowstone National Park.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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A Sugar Maple of peculiar form in the Arnold Arboretum. It looks very like a poplar. The photograph was loaned by Mr. E. I. Farrington, and the tree is fully described on page 727

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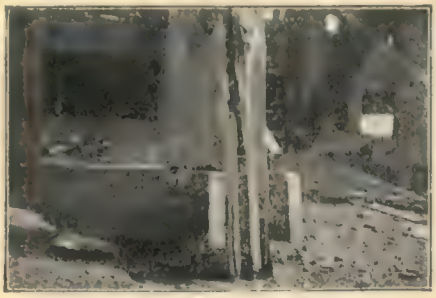
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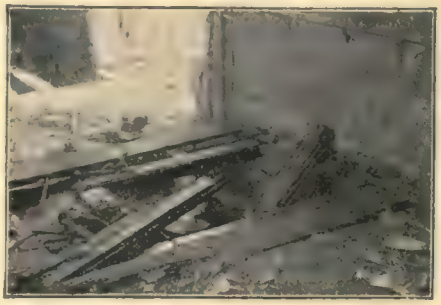
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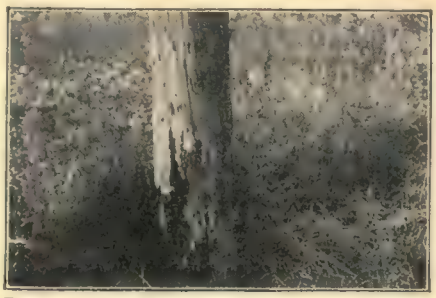
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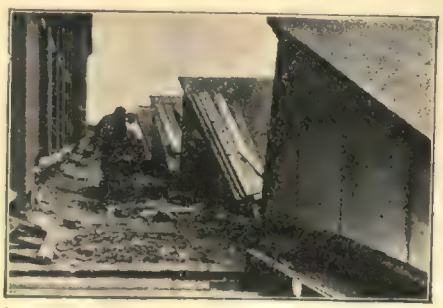
Decayed post of coal chute foundation.



Decayed intermediate sills and flooring of freight cars.



Decay is the greatest enemy of poles. Creosoting protects poles effectively.



Removing decayed roof boards over textile mill —the penalty for neglecting to protect the lumber against decay before erection. (Courtesy F. J. Hoxie, Eng. Assoc. Factory Mutual Fire Ins. Cos., Boston, Mass.)



Wooden barges require repairs due to decay within four to six years. Treatment with Carbosota Creosote Oil will considerably increase their life.

Barrett B Carbosota Grade-One Liquid Creosote Oil

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AMERICAN FORESTRY

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EDITORIAL

CONGRESS AND FOREST SERVICE APPROPRIATIONS

ONE of the important duties of the session of Congress now assembling will be the passage of the annual appropriation bills for the various executive departments of the Government. AMERICAN FORESTRY would like to bespeak its liberal treatment of the Forest Service in general and in four directions in particular. These are increased salaries, fire protection, acquisition of forest lands and research.

During the last few years the integrity of the Forest Service, as of many other Government organizations, has been seriously threatened by the impossibility of paying adequate salaries to the bulk of its employes. This is due primarily to the fact that most of the force is on what is known as the "statutory roll." The salary for each position on this roll is fixed by Congress, or in other words by statute; and Congress has not seeen fit to make any material changes in these salaries in spite of the greatly increased cost of living. Lack of funds has also to a considerable extent prevented the merited promotion of many of those whose salaries are set by the Secretary of Agriculture, and who are on the so-called "miscellaneous roll." As a result of this situation many of the ablest and most experienced men and women have left and are leaving the Service, and an unfortunate but inevitable feeling of unrest has developed among those who remain. Pending the passage by Congress of a comprehensive reclassification measure, three things are needed to bring immediate relief: (1) material increases in statutory roll salaries; (2) removal of the present maximum limit of $4,500 for miscellaneous roll salaries, and (3) appropriation of adequate funds to make possible the promotion by the Secretary of Agriculture of those on this roll.

Additional funds for forest fire protection are also urgently needed. Fire constitutes by far the most serious menace to the perpetuation of the forests of the country and its control is an essential prerequisite to the practice of forestry. During the past year, 27,000 reported fires burned over 8,500,000 acres, to say nothing of the large additional area for which no records are available. Present attempts at control are wholly inadequate, and the current appropriation of $125,000 for Federal cooperation in the protection of State and private lands is insufficient to enable the Government to bear its fair share of the burden. This should be increased to at least the $1,000,000 requested, and the present restriction requiring the expenditure of the funds on the watersheds of navigable streams removed.

The program for the acquisition of forest lands by the Federal Government which was inaugurated nearly ten years ago by the passage of the so-called Weeks Law, should be revivified by the renewal of adequate appropriations for the purpose. It is unfortunate that this work, which has already yielded tangible and decidedly worth while results, should have been allowed to lapse and highly important that it should be resumed at the earliest opportunity, with the removal of the present limitation that all purchases must be on the watersheds of navigable streams. In view of the magnitude of the interests involved on annual appropriation of $2,000,000, is certainly a modest enough sum to be devoted to this purpose.

These and other Forest Service activities should be accompanied by the development of a comprehensive program of forest research. In order to handle our forests and their products effectively, we need to know far more than we now do as to the best methods of forest production and of forest and wood utilization. Such knowledge can be obtained only by properly manned and equipped laboratories and experiment stations. The Forest Products Laboratory at Madison, Wisconsin, the value of whose work has been amply demonstrated, cannot cover its field either fully or adequately with a yearly appropriation of less than $500,000. A similar amount is needed for investigation of the wide variety and infinite number of problems involved in determining the best methods of growing, reproducing and otherwise managing our forests, and for studies in forest economics. AMERICAN FORESTRY believes that there should be a forest experiment station in each important forest region in the country and hopes for rapid progress toward this goal.

The Forest Service is a business organization which is comparable in many respects to the foremost private concerns in the country and whose activities are even more vital to the public welfare. May Congress increase its effectiveness by providing for its finances in a business-like way.

THE GRAVE PERIL OF THE NATIONAL PARKS

ONE of the most important questions before any Congress will come up for settlement at the next session. It involves the continued existence of our National Parks.

It is an issue between a mere handful of farmers living on the borders of Yellowstone National Park who want it for irrigation, plus certain water power interests with an eye to future possibilities, and a great many millions of people scattered through all the states of the nation who want these reservations to remain in the condition of nature without which they cease to be National Parks.

And yet it is in doubt.

Why? Because the Congressmen who represent these very many millions will not believe that they really care. The irrigationists and water power interests are filling the universe with demands; therefore, this is the voice of the Nation. The alleged many millions who want the parks to stay as they are remain silent; therefore, they do not exist.

If this is not Congressional reasoning, the practical result is the same. At the least session Congress presented the parks to the water power people and were barely stopped by a few hastily gathered conservation associations from including the irrigationists in the gift!

No wonder that associations of many kinds, scientific societies, women's clubs, chambers of commerce, museums, universities, national organizations of all sorts, are combining to tell Congress the plain truth when these measures come up again at the next session. It is high time that this Congress discovers what the real people want.

The fact is that recent Congresses have not appeared to know what our National Parks really are. They call them "playgrounds." They are playgrounds. So are the National Forests. So are Lincoln Park and Coney Island. A distinguished Senator recently asked why Yosemite National Park should get large appropriations when Rock Creek Park, in the city of Washington, had "more visitors last Sunday than Yosemite has in a whole season!"

Our National Parks are National Museums. They are carefully chosen specimens of original America which we are holding for our children's children as an exhibit of the wilderness of the pioneer and the frontiersman. A quarter century from now they will be the only examples of original America in a country whose West will be as fully developed as our East is today. They will be the only examples of primitive wilderness within civilization, and the world will come to see them.

Also they are National Museums of the American forest as Nature takes care of her forest; of native lakes and rivers and waterfalls untouched in pristine beauty; of wilds unblemished by the hand of commerce; of American wild animals in their native habitat, unhunted, undisturbed, unafraid.

We can hand nothing down to future generations more wonderful and more valuable than these few, small, widely separated National Museums of a phase of America that is passing with amazing speed.

Let us tell our Congressmen how we feel about our National Parks.

ITALY AND OUR LUMBER EXPORTS

WITH the close of the great war it was generally anticipated in this country that there would be a tremendous demand for American lumber to assist in the reconstruction of Europe. These anticipations have not been realized. In spite of its unquestioned need for wood, Europe has so far failed to deluge this country with orders, and the lumber export business has, contrary to expectations, remained comparatively dull.

While this is a disappointment to the lumber industry, there is no reason to anticipate serious consequences from it. Lumber exports to Europe before the war formed less than two-fifths of our total exports, which in turn have absorbed less than 10 per cent of the total lumber cut. We have, therefore, never depended very largely on our European timber trade, and can doubtless do so still less with the steady decrease in available supplies and increase in domestic requirements. Moreover, from the standpoint of forest conservation the failure of the anticipated demand from Europe to materialize may prove to be a real benefit. With the present annual depletion of our forests amounting to more than four times the annual growth, there is danger in increasing the drain upon them. This is particularly true so long as effective measures are not taken to keep our entire forest area productive. If this were done, however, we should be able not only to meet indefinitely our needs, but probably to have a small surplus available for export.

FIRES, GRAZING AND SOUTHERN YELLOW PINE

SO many conflicting opinions have been expressed as to the effect of fires and grazing on southern yellow pine, and particularly longleaf pine, that it is a welcome relief to secure results based on careful investigation and not on guesswork. Such results are now being obtained from a series of sample plots established in 1915 at Urania, Louisiana, by the United States Forest Service in co-operation with the Louisiana Conservation Commission. Four plots were located in a stand of very young longleaf seedlings. One of these was completely protected from both fire and grazing; another was grazed regularly but protected from fire; the third was protected from grazing but burned annually; and the fourth was both burned and grazed.

After five years it is clear that in this region longleaf pine seedlings are almost totally exterminated by the grazing of hogs. In the fenced plots the original stand of longleaf pine seedlings has practically disappeared, while in the adjacent fenced plots the number of seedlings has actually increased. Fire, on the other hand, has had comparatively little effect on numbers, but a very marked effect on growth. The difference between the heights of the seedlings on the burned and unburned plots is now most striking and demonstrates beyond question the injurious influence of fire in this respect. Experience elsewhere has also indicated that annual burnings by very hot fires are apt not only to retard, but in time to destroy young longleaf seedlings, while it is common knowledge that loblolly and shortleaf pine seedlings are very susceptible to killing by fire.

These results are corroborated by some supplementary and less intensive experiments undertaken by the Urania Lumber Company. Hog grazing is uniformly destructive and fires are detrimental. Another interesting fact brought out is that fires encourage the growth of the coarse sedge grass which is of little or no value for grazing, and discourage the growth of the valuable carpet grass, clover and lespedeza; while ordinary cattle grazing, unaccompanied by fire, has the opposite effect. Fire is therefore undesirable from the standpoint of grazing as well as forest production.

These facts have a direct and immediate application. During the present year there is an unusually heavy crop of longleaf pine seed. This should result in the establishment of an excellent stand of longleaf seedlings which could not be secured artificially at a cost of less than $5 to $10 an acre. In order to make the most of this opportunity to secure the free restocking of many cut-over areas, forest owners should use every possible precaution to protect the reproduction by keeping out fires and hogs.

CONFERENCE ON FOREST EDUCATION

A CONFERENCE of teachers and employers of foresters has been called to meet at New Haven, Connecticut, on December 17 and 18, to consider the entire question of forest education. The scope of the meeting is thus very broad. Discussion will not be limited to the training of professional foresters, rangers and specialists in various lines, but will include extension work, vocational education, forestry as a cultural subject in high schools and colleges, and the place of research and public service in the forest schools of the country.

Such a conference should be productive of much good. It is ten years since the last meeting of this kind was held. In that time great changes have taken place in the opportunities for foresters and in the character of the men required. New lines of work have opened up and old lines have been modified. Taken as a whole, the problem of forest education today is quite different from what it was a decade ago. It is, therefore, decidedly worth while for those who are interested in the problem, whether from the standpoint of the instructor or the employer, to get together for the free interchange of ideas and the formulation of constructive policies.

AMERICAN FORESTRY ventures to express the hope that certain features of the program will receive special consideration. In its judgment there has been a tendency up to this time to devote too little attention to the training of the lower grades of forest officers—the rangers and guards. Highly trained professional men are of course essential to conduct investigations and to direct the administrative work. But as the practice of forestry becomes more general, there will be an increasingly urgent need for less highly trained men to handle the bulk of the practical woods work. The time cannot be far distant when this country will find itself in the position Europe is now in of requiring several rangers for every professional forester. It is, therefore, important that prompt steps should be taken to provide more ample facilities than now exist for the training of men of this type.

There are two other important fields in forest education that are still, comparatively speaking, virtually untouched. A promising start has, it is true, been made in extension activities aimed at teaching the farmer and other woodland owners unable to hire foresters of their own better methods for the handling of their forest lands. But in comparison with the need for such work and with what is being done in many lines of agriculture, the surface has as yet hardly been scratched. Here is a fertile but uncultivated field awaiting development by the forest schools with every prospect of yielding substantial and far-reaching results.

Still less has been accomplished in the direction of teaching forestry as a cultural subject in our schools and colleges. The average student who does not specialize in forestry, completes his work with only the haziest ideas as to the character and extent of our forest resources and their place in our national economy. This is unfortunate from several standpoints. Certainly forests and their products are so closely interwoven in a hundred ways in our daily life that every well-educated man and woman should know more than is now the case of the part which they play. The general diffusion of this sort of knowledge regarding our forests would prove one of the most effective means possible of securing their better management. Here too, is an opportunity not yet taken advantage of for rendering of a dual service to education and to forestry. We hope that the conference at New Haven will take the leadership in promoting effective action along this line.

FIRE PROTECTION TO SAVE OUR FORESTS

BY ROY HEADLEY

TO stop the devastation of our forest land it is not necessary for public opinion to support some new-fangled system of forestry; all that is necessary to keep the bulk of our timber growing land continuously producing timber after it is cut over is the adoption of a different attitude toward fire. More than fire protection is often necessary to keep forest land producing the most valuable species or producing at absolutely full capacity in terms of board feet per acre per annum. But, as a rule, fire protection alone will keep our forest lands continuously producing some timber and avoid the necessity of resorting to artificial planting. Ten million idle acres in Michigan are a burden, rather than an asset to the State, because of fire. The million acres of non-productive brush field among the timber lands of the National Forests of California are non-producing wastes because of fire. Millions of acres in Pennsylvania which once supported the stands of pine and hardwood, which enabled that State to take first place in lumber production in 1860, have become covered with scrub oak, or other trash, not primarily because of reckless cutting, but because of reckless and repeated burning.

Nothing in the treatment which has been given American natural resources is more amazing than the characteristic indifference of Americans to the wasting by fire of our indispensable resources of timber. Sober-minded people who scrupulously conserve the soil resources of their fields, and who vigilantly guard their family incomes, have exhibited serene indifference to the fires that have left us, among other things, our 81 million non-producing acres and which are still adding to this American Sahara. Not only is there indifference; there is habitual carelessness with fire on the part of the same individuals who are feeling even now the effects of a timber depletion that is caused chiefly by fire.

There were 27,000 recorded forest fires in 1919, burning a total of 8¼ million acres. During 1918, 25,000 fires burned over 10½ million acres of forest land. An additional acreage was burned each year of which no record could be obtained. Of these thousands of fires only a tiny fraction are due to lightning and unpreventable accident; the great majority of the fires that are constantly enlarging our deserts of barren sand, scrub oak, chaparrel and briers, are due to the carelessness of human beings—due, not only to the carelessness of persons who are directly responsible for the fires, but to the indifference of the great body of people whose composite opinion permits the campers, the farmers, the railroads, and others to start and leave or lose control of the fires that do the damage.

The Minnesota fires of October, 1918, which destroyed over 300 human lives and 20 million dollars worth of property, were due to the indifference of public opinion. There were laws in force which, if respected and en-



DESTRUCTION OF YOUNG TREE GROWTH IN ONE OF THE MINNESOTA FIRES OF 1918

Observe the prone young trees—blown down by the hurricane which was largely due to the air disturbances caused by the fires. There were good laws for the protection of forests there, but public opinion did not support existing protective legislation, and the result of this situation was the catastrophe which shocked the whole country and left thousands homeless and destitute.

forced, would have prevented the catastrophe. It was against the law for people to set fires during this period. It was against the law to run locomotives or threshing rigs that set fires. It was against the law for people to ride along the highways throwing burning cigars, cigarettes, or matches into the dry tinder alongside. But public opinion was not united in support of the law. Many persons believed fire a beneficial agency, or at least, not harmful. Public opinion had denied State Forester Cox an adequate number of men to enforce the law and extinguish fires while small. When the wind came up the result of this situation was the catastrophe which shocked the whole country and left thousands homeless and destitute. It is a curious circumstance that these fires burned over part of the area swept by the Hinckley fire of 1894, in which 418 lives were lost and enormous damage inflicted.

If a foreign army should cross over the international boundary and kill 300 Minnesota people and destroy 20 million dollars worth of property, something would be done about it promptly and vigorous measures would be taken to prevent a recurrence of the disaster. Will public opinion any longer continue to look with indifference, or with only a mild and temporary concern, on the fires that are robbing us of the productivity of our forest lands and hastening the day when Michigan can no longer secure even from Louisiana and Mississippi the oak and hickory she once supplied to her industries, but will be forced to depend on Siberia and South America?

Pending the enactment of the new legislative program outlined later in this article much may be done by a vigorous enforcement of existing laws prohibiting carelessness and misuse of fire.

It is now possible in many regions to observe the symptoms of a house divided against itself. Public opinion, in its better moments, has secured the enactment in many States of reasonably good laws regarding the starting of fires. Often these laws could be improved, but it is surprising what efficient fire laws are to be found in most States; no law is self-enforcing however, and after securing the passage of good fire laws public opinion has often relapsed and refused both the funds and the sentiment that are necessary to enforcement. State fire wardens, State foresters, and National Forest supervisors are often found struggling valiantly to detect and suppress fires that would never have been started but for the indifference or secret encouragement of local opinion. The result of such a clash of forces is not a happy one. The resulting fire protection is very imperfect. A house divided against itself can not stand.

But in all this confusion there is to be found a clue to one of the most notable recent developments in practical fire protection. Fire laws have usually been considered unenforceable in so far as they relate to the apprehension of the persons immediately responsible for fires. Professional detectives and police officers have



A MAGNIFICENT STAND OF TIMBER COMPLETELY DESTROYED BY FIRE

This example of utter destruction is on the Oregon National Forest and it would be difficult to estimate the total loss. The area has now been artificially planted to Douglas fir, but the old snags and logs will long constitute a serious menace to the growing stand of timber.



FIRE RUNNING THROUGH AN OLD BURN

Forest officers find it next to impossible to suppress such fires in high winds because sparks fly from snag to snag in defiance of human efforts, but much could be done to relieve the terrific danger of large unmanageable fires by the securing of appropriations—State and Federal—sufficient to provide proper protection.

usually been ineffective in dealing with the circumstantial evidence on which the proof for fire law violations ordinarily depends. The detective and police officer are equipped with knowledge and skill well adapted to successful handling of violations of law up to the point where a knowledge of wood craft is required. Crime and criminals are largely confined to cities and settled regions. Few police officers are woodsmen.

The arts of the woodsmen are not easily learned, especially by mature men. It has been found much easier to transfer something of the knowledge and skill of the accomplished detective to the forest ranger, than to add the ranger's knowledge of the woods to the detective's equipment.

The rangers of the National Forests of California were trained in some of the essentials of the art of following clues and recognizing and handling evidence. A vigorous fire law enforcement campaign was inaugurated. The result was that arrests for fire law violations increased 400 per cent the first year and then doubled again the second year. Fires due to human agency began to decrease in a gratifying fashion and, best of all, there was abundant evidence that vigorous fire law enforcement was highly effective in crystallizing and stimulating public sentiment in favor of fire protection. It is as true in fire protection as in other things that nothing breeds disrespect for a movement more than lax enforcement of a law, and nothing rallies support for a movement, about which opinion is divided, more effectively than vigorous and impartial enforcement of whatever laws there may be in effect on the subject.

Law enforcement has its limitations, of course. The heaviest losses on the National Forests during the three bad years ending with 1919 were due to lightning fires. Serious additions to our 81 million acres of non-productive forest land have occurred, even on the National Forests, because it often happens that from 25 to 100 lightning fires are started by a single dry electric storm on an administrative unit in which the woods are dry as a tinder box and there is only a guard to every one or two fires. When this happens, the result is that some fires get big, destructive, and unmanageable. All big fires are more or less unmanageable. The only way to make protection protect in a lightning country is to provide enough men, telephone lines, trails, and enough of the spirit of "go-get-'em" to make it possible to catch fires small.

The best kind of a fire on the record of a protective

organization is no fire at all. Next to no fire at all, the best looking fire on a season's record is what the United States Forest Service calls a "Class A" fire—one-quarter acre or less in extent. In a lightning belt, to attain a record with a high percentage of Class A fires is a problem in money, men and management. Without more men and money the National Forests must continue, whenever a bad year occurs, to contribute to our national area of non-producing land. Mr. and Mrs. Average Citizen must see that more funds are provided if they want the National Forests to be under protection that really protects.

It is not entirely correct to say that elimination of fires due to human agency is a problem in public opinion, law enforcement and legislation. Here, also, men and money are required. In 1918 State Forester Cox was able to put into the field in Minnesota one man for every 350,000 acres that needed protection; 350,000 acres makes a tract 23 miles square. There were arrests and convictions for fire law violations, but with a tract 23 miles square for each man to look after, is it any wonder that there were many fires burning uncontrolled on October 12, ready to be fanned by the wind into a catastrophe?



A SCENE OF DESOLATION AFTER FIRE ON THE KANIKSU NATIONAL FOREST

The lumber industry of the Inland Empire will decline unnecessarily because of this and similar burns. Nothing is more amazing than the characteristic indifference of Americans to the waste by fire of our indispensable timber resources. Public opinion must be educated to understand that fire protection and scientific forestry are common sense measures calling imperatively for practical support.

While fire law enforcement requires men and money for State and Federal services, it is nevertheless a comparatively cheap and a comparatively neglected method of fire protection open to all who are interested in fire protection. Private citizens who want to promote fire protection are not in a position to personally run down clues and make arrests, but they can ask questions of their officials and, by offering support and indicating that they expect results, they can create a pressure which will move mountains.

Fire law enforcement is a field in which leadership has a chance to function—leadership by individuals within or without public service. We are at the stage of the development of fire protection when such leadership has its great opportunity and responsibility. Not National or State leadership—that is necessary enough—but the great opportunity is for the leadership of little groups and middle-sized groups; the man who goes before the little group at the country store or in the smoking room of the sleeping car and stands for better treatment of our country's forest land—this is the leader who just now has an unusual opportunity to form and crystallize public opinion.

Such leaders may find in fire law enforcement one of the topics worth talking about. It provides a definite, understandable banner to raise; and for the benefit of those who are still in doubt, let it be repeated over and over again—fire laws are enforceable; violators, even the smoothest of malicious incendiaries can be apprehended; the proof lies in three years' experience in the National Forest Service in which both Federal and State fire laws have been enforced with increasing success; and last, but not least, that vigorous fire law enforcement can not be surpassed as a means of enabling public opinion to discard definitely and for all time the old views that belonged with the days when timber was often a nuisance. Fire law enforcement aids public opinion to accept consciously and aggressively the view that the days of too little timber have arrived, and that fire protection, scientific forestry and artificial planting are all common sense measures calling for action on behalf of the interests of the public by its elected representatives.

It is inconceivable that public opinion will much longer risk the forfeiture of the economic advantage this country possesses because of its enormous timber growing resources, or continue to regard with complacency the depletion of our forests until wood products are priced on the basis of imported luxuries. The particular steps recommended by the National Forest Service to put our timber supply on a self-sustaining basis include:

Extension of the Weeks Law, which will enable the Forest Service to assist the States in fire protection and

the practice of forestry. Not less than $1,000,000 is necessary and should be appropriated with a proviso that States benefiting from the fund must expend an amount equal to that received from the Federal Government.

The Secretary of Agriculture should be authorized to require reasonable standards in the disposition of slashings and other measures necessary to prevent forest devastation. Activities under this law should not be restricted to waters of navigable streams, but should embrace any class of forest lands in the co-operating States.

Enlargement of the National Forests should be provided for by means of purchase of forest or cut-over lands, with an annual appropriation of at least $2,000,000 for this purpose; by authorizing the Secretary of Agriculture to make land exchanges; and by reducing the methods by which land now in Government ownership may be alienated.

Progressive reforestation of denuded lands should be provided for with a yearly sum beginning at $500,000 and increasing to $1,000,000 as soon as the work can be organized on that scale.

Legislation should be enacted providing for the study of the effects of the existing tax methods and practices upon forest devastation.

A comprehensive survey of the forest resources of the United States is needed, and an appropriation of $3,000,000 should be provided for that purpose.

The continuous study of the technical phases of reforestation in the principal timber regions should be provided for by appropriations which will make it possible to restore and enlarge the forest experiment stations discontinued on account of lack of funds.

THOSE PAPER CLOTHES

SECRETARY BURR, of the National Association of Box Manufacturers, says:

"Rather than wear wood pulp B. V. D.'s, a wall paper shirt with cardboard front, a Chicago American vest and kraft Prince Albert, I shall imbibe a wood alcohol sundae and go to meet my Puritan ancestors in a wooden kimona."—American Lumberman.

AMERICA'S YOUNGEST LUMBERJACKS

ALMERON and Roland Berlanger, aged 11 and 9 years, respectively, are probably the youngest lumberjacks in the world. Working in the New York State forest for their father during the summer, they do the equivalent of one grown man's work each day.

And their work, of cutting up a giant spruce into pulpwood, tells why the cost of your daily newspaper has been going up.

Forestry students from the New York State College of Forestry at Syracuse, on a field trip in the Adirondacks, near Cranberry Lake, New York, measured the tree.

The spruce tree which these baby lumberjacks have been cutting up into four foot lengths for pulpwood, was found, by counting the rings of annual growth, to have been a sapling fully 300 years ago. The tree which took three centuries to mature, has been cut down by children of 10 years, and its measurement shows it will make about 800 pounds of newsprint paper.



HARD AT WORK

These youngsters fully appreciate the seriousness of the situation, and are determined to do their part toward supplying the paper makers with proper pulpwood.

The work of the baby lumberjacks is one more evidence of the manner in which the nation's raw material supply for its paper mills is vanishing, and of the need for restoring America's spruce forests if newspapers are to continue to be.

WHY IS A RANGER?

"Oh, a Ranger is in danger of congestion of the brain, if he tries to keep all posted up on every latest plan. He is but one lone mortal, at the crossing of the ways of a thousand different theories, of a thousand different days. He must be an expert woodsman and a guide and trapper, too; and must know in all emergencies the proper thing to do; how to fix a motor, mend a leg or rope a steer, play a tune on the typewriter to please the diplomatic ear; also how to run a survey, find a corner where it ain't, and, in extra stressful moments, exercise restraint. He must be a sawmill expert, cowboy and lumberjack, and an information bureau, plumb full of statistic fact. And he must be trained in botany, know every growing plant—so's to educate the cattle what they can eat and can't. He must know the birds and animals, the insects and the fish, their every need and comfort, their every wile and wish, including why a wood chuck would and why a dodo don't, as well as why a whippoorwill and why a coyote won't. All professions and sciences and every common trade is the fund of useful knowledge for which he's highly paid. And still there's something to it that holds the Ranger on, when he tells himself and all his friends that he would fain be gone."—The Idaho Forester.

PULPWOOD FROM BRITISH COLUMBIA

BY ARTHUR NEWTON PACK

RAPIDLY mounting costs of newsprint and other kinds of paper during the last two years have suddenly called to the attention of the public the startling fact that the mills of the eastern section of the country must be supplemented by mills elsewhere; that the annual supply of pulpwood in the East must be increased by fire protection, reforestation and other measures, and that new supplies must be developed and the production increased.

A few years ago the location of the pulpwood supply was a matter of little moment to any but the paper manufacturers. Today not only these manufacturers, but representatives of this government and foreign nations are searching the world for available supplies. We are looking from our already limited eastern forests and those of eastern Canada to the Pacific coast—Washington, British Columbia and Alaska.

According to the reports published in 1918 by the Commission of Conservation of Canada, the total amount of timber in the coast region of British Columbia of species suitable for the manufacture of pulp is over ninety-two billion feet, or approximately one hundred and thirty-two million cords. In British Columbia one cord of pulpwood is taken as equivalent to six hundred board feet. Nearly two-thirds of this is western hemlock (*Tsuga heterophylla*), a wood which seems to possess certain necessary qualities of fibre which permit its use largely in place of spruce for the manufacture of newsprint pulp. Of the rest fifty-eight per cent is Sitka spruce (*Picea sitchensis*), and forty-two per cent balsam (*Abies Grandis* and *Abies Amabilis*).

The pulpwoods are quite generally found in stands mixed with Douglas fir and western red cedar, but British Columbia has a distinct advantage over the coast forests of Washington and Oregon from the point of view of the pulp manufacturer, in that almost pure stands of pulpwood may be found on easy logging ground and at generally lower altitudes than on our side of the line.

Not all of the ninety-two billion feet mentioned above can be utilized solely for the manufacture of pulp. Because of the strength of its fibre clear spruce lumber is always in good demand and brings prices equal to Douglas fir—its use in the manufacture of airplanes, for instance, having been much emphasized during the past war. Now that after the war surpluses have been absorbed, many pulp mills cannot afford to pay the prices demanded for spruce logs, and such concerns as do not control their own supply are obliged to yield to sawmill competition. Balsam makes an excellent box wood, but as yet British Columbia paper manufacturers have had little competition from that source.

The country is just awakening to the value of western hemlock as a saw timber. On the Pacific coast western hemlock is already quite generally preferred to fir for interior wood work, or in any place where it is not to be exposed to the weather. The grain is more pleasing to the eye than that of fir. The British Columbia sawmills cut 175 million feet of hemlock during 1919, and received as high or higher rates for the lumber than for Douglas fir although they paid from $5.00 to $8.00 per thousand less for the logs. During the same year the British Columbia pulp mills produced 190,000 tons of pulp, sul-



Photograph by Arthur Newton Pack.

SITKA SPRUCE FROM BRITISH COLUMBIA FORESTS

This spruce, of which there are some twenty-five million cords in the coast region of British Columbia, has been made into a form of boom known as a Davis raft to be towed. The logs were cut by the Powell River Paper Company on Kingcome Inlet.

phite, sulphate and groundwood, which might be estimated as consuming two hundred million feet of logs. If sixty percent of the wood so consumed was western hemlock the total consumption of hemlock by the pulp mills would be only 120 million feet—less than the sawmill consumption by fifty-five million feet.

There are at present operating in British Columbia five pulp producing companies with an estimated total annual capacity of some 240,000 tons. It is difficult to make a correct estimate of capacity at a given time as some changes in control are being made and the capacity of one or two companies is being increased. Each of these concerns controls timber estimated to last them from forty to one hundred years, the aggregate stumpage controlled being probably about twenty billion feet.



Photograph by Arthur Newton Pack.

HEMLOCK LOGS FOR PULPWOOD

Over sixty-two billion feet or eighty-eight million cords of this hemlock suitable for pulpwood is on the coast region of British Columbia. The logs in the photograph are ready to be hauled to tidewater and towed to the Howe Sound plant of the Whalen Pulp and Paper Mill.

This stumpage is chiefly held under so called pulp leases from the British Columbia Government. On some of the older leases the rental paid amounts to only two cents per acre and the government collects a flat royalty of 50 cents per thousand feet for the timber when it is cut. The more recent leases and renewals of the old ones now call for an annual rental of 22 cents per acre and a royalty of 87 cents per thousand, which is the same as the regular rate for standard Provincial Timber Licenses. Forest titles in British Columbia forms a subject in itself which cannot be treated here. It is sufficient to state that less than one-fifth of the forested land of the coastal region is owned outright by individuals, the patenting of commercially timbered land having ceased by act of the Provincial parliament. The bulk of the forested region remains the property of the Province of British Columbia which leases the right to cut the timber thereon—rentals being set for a period of thirty years in advance. The government takes most of its pay in the form of a charge on the timber when cut, known as a "Royalty," this royalty also being fixed for a period of five years in advance with provision for extension for subsequent five-year periods on a sliding scale in accordance with certain log market quotations. A "Timber Limit" or "Timber License" is such a permit covering a particular square mile of territory. These licenses are now perpetual and are transferable. They cover almost the entire commercially timbered area of the coastal region.

Logging in much of this region is generally carried on quite independently from sawmill and pulp mill operations by a variety of loggers and logging companies. Accordingly Vancouver has become the location of a large open market for logs—the buyers being the sawmills and pulp and paper companies. The pulp and paper companies are regularly large buyers of hemlock and balsam logs, but usually take delivery at the loggers' camp or some northern point rather than at Vancouver, as the nearest pulp mill is 32 miles up the coast and the others range from 75 miles to several hundred miles north and west. The sawmills on the other hand are chiefly in and about Vancouver. During the recent slump in the price of cedar and fir logs representatives of the pulp companies continually urged the loggers to put in more hemlock, and contracted to buy hemlock logs at prices which have permitted many loggers to get through the slump in pretty fair shape. Apparently this policy is pursued by the pulp companies not only to conserve their own supply but also to avoid the necessity of themselves investing in more logging outfits and equipment when increased raw material is needed. Then too their pulp leases naturally contain a fair proportion of saw timber—cedar and fir—which offers a problem for disposal, particularly when the lumber market

is weak. The purchase of pure pulpwood in the open market in a large measure obviates such necessity.

These recent developments tending to enhance the value of the formerly despised western hemlock furnish a situation which was hardly dreamed of only a couple of years ago. The timber investor who once thought himself "stung" and found too late that he had bought timber licenses with little or no market value in spite of



Photograph by Arthur Newton Pack.

NEWSPRINT IN THE MAKING

A heavy stand of medium sized but very tall hemlock on Vancouver Island which will furnish pulpwood for the making of newsprint.

not unfavorable location and good logging chance, now finds that he has a valuable investment. The logger who was accustomed to entirely overlook the little patches of pure hemlock and balsam along the creek bottoms except when he needed boom sticks, now leaves his cedar for the time being and builds his road so as to reach all the pulpwood he can. Lately even the sawmill operator who counted hemlock lumber his most paying line, because he could buy the logs cheap and sell the lumber at fir prices, has begun to look around for a location where the pulp mill buyer offers less keen competition.

There are such locations. The British Columbia coast has several distinct natural barriers which tend to form separate districts—each with slightly different logging and marketing conditions.

The first district, and best known, is that frequently called the Sheltered Waters district. It extends from Vancouver north and west along the mainland coast taking in the many inlets and islands as far north as the end of Vancouver Island. Where the Gulf of Georgia ends in a maze of small islands and channels near Campbell River on Vancouver Island this district extends across and includes the northeastern section of that island up to the northern end. Of this district Vancouver is the marketing center and the open market for logs generally prevails with competition between sawmills and



Photograph by Arthur Newton Pack.

BALSAM IN BRITISH COLUMBIA

A large stand of balsam in British Columbia will help to supply the demands for pulpwood in the United States and Canada.

paper mills for the pulpwoods. There are four pulp mills in this region: The Mill Creek plant of the Whalen Pulp and Paper Mills, Ltd., on Howe Sound; the former Rainy River Pulp and Paper Company, Ltd., now being reorganized, at Seaside Park; the Powell River Company, Ltd., at Powell River, and the Beaver Cove Pulp and Lumber Company, Ltd., at Beaver Cove. The



Photographs by R. S. Kellogg.

PULPWOOD LOGS AND PAPER MILLS

Upper—Spruce logs for making paper at Ocean Falls, British Columbia.

Middle—Pulp and paper mills of the Powell River Company, Ltd., British Columbia.

Lower—Pulp and paper mills of the Pacific Mills, Ltd, at Ocean Falls, British Columbia.

Powell River Company turns out 75,000 tons of newsprint per annum, while the other companies make only chemical pulp, as follows: Mill Creek, 24,000 tons sulphite pulp; Beaver Cove, 12,000 tons sulphate pulp. It is understood that the Seaside Park plant is to produce 12,000 tons per annum.

From Campbell River southward along the easterly shore of Vancouver Island, the territory served by the E. & N. Railway, the timber is more readily tributary to mills at Vancouver or scattered along the railway. The Gulf of Georgia is here wide and often rough, making towing to Vancouver more hazardous. Here are no pulp mills and consequently no pulp mill competition for logs. In fact nearly all the logging is done by the sawmill companies themselves, and the independent logger is conspicuously absent. The hemlock and balsam in this area is sold only for saw timber. On the other hand the Canadian Government Railway is being extended through to Port Alberni, on the west coast, and in this westerly area so much pulpwood is to be found that probably a few years may well see the construction of a pulp mill in the Port Alberni neighborhood, and the consequent introduction of the competitive demand for hemlock and balsam.

The west coast of Vancouver Island is another separate district. Its inlets are deep and protected just as in the Sheltered Waters area, but to reach the log market of Vancouver booms would have to be towed around through the open Pacific. The risk has been found to be too great for practical operations of this kind, and consequently here again there are no independent loggers. This area runs very highly to pure pulpwood stands, the fir which forms very heavy stands near the southern end of the island, gradually diminishing until in the neighborhood of Quatsino Sound it is seldom seen. The cedar also becomes comparatively scarce. The typical development of this area is shown by the export pulp mill of the Whalen Pulp and Paper Mills, Ltd., at Port Alice, Quatsino Sound—a sulphite pulp mill with present capacity of 18,000 tons per annum, but designed for an ultimate production of 60,000 tons. In connection with this plant is a saw and shingle mill cutting for export, and designed to take care of whatever saw timber is found mixed with the pulpwood stands. This company has sufficient stumpage around Quatsino Sound to supply its mills for a number of years to come with considerably more lumber in adjacent holdings available for purchase at a reasonable price. The products ready for export are sometimes loaded on scows for towing to regular export points, but already ocean freighters have docked at Port Alice, and with the expansion of the pulp capacity doubtless more of the product will be thus loaded at the plant. According to the report of the Commission of Conservation of Canada nearly one-third of the pulpwood of the British Columbia coast area is located in the west coast region of Vancouver Island.

The Northern Mainland is often considered in conjunction with the Queen Charlotte Islands as a single district, although there is more or less climatic difference.

In this region is located the Pacific Mills, Ltd., plant at Ocean Falls with a capacity of 70,000 tons of newsprint and 15,000 tons of Kraft paper and Kraft pulp per annum, and also the Swanson Bay plant of the Whalen Pulp and Paper Mills, Ltd., with a capacity of 12,000 tons of sulphite pulp per annum. These mills obtain their timber largely from leases and timber licenses along these northern inlets and also from the Queen Charlotte Islands. There are a few small independent loggers who sell their output also to the sawmills at Prince Rupert.

These natural barriers, bringing about separation into districts, cause a distinct variation of stumpage values between the different regions. Within the Sheltered Waters area the price for a given class of stumpage is governed largely by towage rates for logs to the Vancouver market. It must be borne in mind however, that in speaking of the market value of stumpage in British Columbia, only the value of the right to cut the timber is meant. In reality the timber continues to belong to the government until cut and the royalty paid. To compare the price of British Columbia stumpage with timber in the United States one must add to the purchase price the amount of royalty which will have to be paid on the logs cut, and even then allowance must be made for the saving in carrying charges brought about by the deferred payment of royalties. It would be safe to say that readily loggable hemlock and balsam stumpage in the Sheltered Waters region now brings from $1.00 to $1.25 per thousand. On the west coast of Vancouver Island, however, out of the safe towing area, prices of less than half this amount are frequently encountered. Nevertheless, the small investor in pulpwood stumpage usually prefers to stick to the inside coast, where the independent loggers working for both pulp and sawmills are ordinarily ready buyers of a good logging chance, and the owner of a single good timber limit generally has as much opportunity for profit as the man with half a billion feet. For the same reason the conservative investor has usually kept out of the Northern Coast district, leaving that ground for those who are financially able and willing to put in their own developments and sell the product as finished lumber or pulp.



Photograph by R. S. Kellogg.

CANADIAN NEWS PRINT FOR AUSTRALIA

Newspapers of Australia use large quantities of the newsprint made by British Columbia mills, the rolls shipped being nearly twice as tall as a man. The photograph shows the loading of paper at Powell River, B. C

Forest fires have become such a serious menace to our national timber resources that the generally low fire risk in British Columbia should be mentioned. Primarily the Provincial Government has instituted an extremely good system of fire protection, which appears to be quite intelligently administered, the fire rangers being given sufficient authority to commandeer available assistance needed in fire-fighting. Each ranger, however, has rather too much territory to cover most effectively. The cost of the service is divided between the government and the timber license owners, and all timber licenses and leases are now assessed at two cents per acre.

The real protection of the British Columbia pulpwood forests is climatic, the rainfall varying for different districts and regions, but generally high all along the coast. In the Sheltered Waters region the rainfall varies from about 60 inches to over 100 inches, with nightly heavy fogs in the northerly portions during a large part of the year. Southeast Vancouver Island has the lowest rainfall—averaging about 46 inches, but the west coast has from 70 to 118 inches of precipitation each year, the higher records being made nearest the ocean and the lowest inland. The Northern Mainland area is reported to have from 60 to 170 inches—again decreasing further from the coast, while the Queen Charlotte Islands have as low as 40 inches per annum. During the summer dry season nearly every district frequently suffers considerable fire loss, usually adjacent to logging operations from which the fires start, but in many cases the timber is so "pocketed," one tract of several square miles being shut off from another by high mountains, that the risk is a minimum.

The growth of the pulp and paper industry in British Columbia was very rapid in the last two years. Chemical wood pulp production in 1911 was 90 tons, in 1914 it had grown to 13,000 tons, in 1917 to 46,507 tons and in 1919 to the top production of 89,520 tons.

Mechanical wood pulp production, practically nothing previous to 1917, was 65,620 tons that year and 99,769 tons last year, while the production of paper developed steadily from 45,816 tons in 1913 to 130,809 tons in 1919. Larger productions than these top figures are expected both this year and next.

A Real Community Christmas Tree

THE community tree at Walpole, New Hampshire, the first to be reported to the American Forestry Association, was planted by the Town Improvement Society of that village as a memorial to the late Judge Henry E. Howland, of New York City.

Judge Howland was born in Walpole, and during his long and distinguished career never failed to hold his boyhood's home in loving remembrance. He was a frequent visitor there, and his genial presence, and delightful speeches were a feature of Old Home Day and other celebrations. He was a devoted friend and interested in everything that could be of benefit to the town. He loved the beautiful trees which adorn the village streets, and on one occasion succeeded in preventing the destruction of some very fine specimens, ond contributed liberally to the fund which the Improvement Society raised for planting new trees to replace those which were dying.

It was suggested by F. A. Spaulding, president of the Improvement Society, that an evergreen tree, to be known as the Henry E. Howland Memorial Tree, be planted on the village common, and that it be used as a community tree which should symbolize the lasting affection between Judge Howland and his native place.

In order that the meaning of the tree may never be forgotten Judge Howland's daughter, Miss Frances L. Howland, has had set in the concrete of the tract crossing the common beside the tree a marker with this inscription:

THIS TREE WAS PLANTED BY THE WALPOLE TOWN IMPROVEMENT SOCIETY IN LOVING MEMORY OF HENRY ELIAS HOWLAND 1835—1913



THE BEAUTIFUL COMMUNITY CHRISTMAS TREE AT WALPOLE, NEW HAMPSHIRE, WHICH WAS ORIGINALLY PLANTED AS A MEMORIAL IN HONOR OF JUDGE HENRY E. HOWLAND

The tree has been illuminated on every Christmas Eve and on successive nights, except the war Christmas, when, to conserve electricity, the Christmas trees throughout the country were generally dark.

The beautiful old custom of singing Christmas carols round the tree has been established, and after that the choristers move on, singing carols outside homes where there are "shut-ins," or where there is illness.

NATIONAL FORESTRY PROGRAM APPROVED

IN New York on October 15, for the first time after many years of agitation and controversy, a definite proposal for a national forest policy received the preliminary endorsement of the several elements chiefly concerned, which promises well for its adoption and for its success through their co-operation and through fair sharing of public and private responsibility.

At this conference accredited representatives of the nation-wide lumber and paper industries which control most of the commercial forests in private ownership met with similar representatives, speaking in behalf of the general public, and of the wholesale lumber distributors, the newspaper organizations vitally interested in the paper supply as well as in general economic welfare, and the great wood-using industries such as furniture and vehicle manufacturing, railroad operation and the like.

These organizations included the following:

National Lumber Manufacturers Association, National Wholesale Lumber Dealers Association, American Pulp and Paper Association, American Newspaper Publishers Association, Association of Wood Using Industries, Western Forestry and Conservation Association, United States Chamber of Commerce, American Forestry Association.

Unanimous agreement was reached on all essentials of a federal legislative program, more specific in detail but substantially in accord with the recommendations made last June to the United States Senate by Chief Forester W. B. Greeley. Colonel Greeley was also at the conference by invitation and gave its conclusions his full approval on behalf of the United States Forest Service. It is expected that this preliminary agreement, being thus so significant of accomplishment through its full consideration of the public welfare, will receive the ratification of all the public and private agencies represented, and also be acceptable to the majority of others interested, including the forestry departments of the several states.

The primary provisions are two-fold—for a considerable extension of direct federal activity in forest ownership and production, and for the development with federal aid and encouragement of such systematic policies in the several forested states as, being consistent with local conditions, will bring about adequate forest protection and reproduction in the interest of these states and of the public at large.

With these aims, the program provides specifically, through co-operation between the Government, the states and owners of timberlands, for adequate protection against forest fires, for reforestation of denuded lands, for obtaining essential information in regard to timber and timberlands, for extension of the National Forests, and for other steps all essential to continuous forest production on lands chiefly suitable for this purpose.

Much of the responsibility thus outlined lies with states and with private owners. To define that which lies with the Government and hence is properly for the consideration of Congress, the following legislation is proposed.

1. Authorizing the Secretary of Agriculture after consulting appropriate local agencies to approve an adequate policy for each state, covering the essentials of fire protection on timbered and restocking lands, reforestation of denuded lands, and, where and to the extent necessary, the cutting and removing of timber crops so as to promote continuous production of timber on lands chiefly suitable therefor, and authorizing his co-operation in the work required, provided there is also satisfactory local compliance in state legislation or administrative practice. Chief, although not entire emphasis for the time being on fire prevention, as the most important single step, and not less than a million dollars annually available for such co-operation with states.

2. A survey to obtain necessary information as to forest resources, forest production and forest requirements of the nation.

3. Provision for studies and experiments in forest reproduction methods, wood utilization, timber tests, wood preservation, development of by-products and other steps to bring about the most effective use of the nation's forest resources.

4. Provision for a study of forest taxation, to assist states in devising tax laws which will encourage the conservation and growing of timber. Also methods of insuring against forest losses by fire.

5. Provision for more rapid replanting of the vast areas of denuded lands within the National Forests.

6. Appropriation of ten million dollars a year for five years for the purchase of lands which should be added to the National Forest system, whether or not on the headwaters of navigable streams as such purchases are now limited.

7. Authorizing acquisition of similar lands by exchanges of land or timber when clearly in the public interest.

8. Authorizing the addition to National Forests of lands now in other forms of government ownership but found chiefly suitable for permanent forest production.

Some of these features of a complete Federal program will doubtless be covered in whole or in part by recommendations to Congress by the Secretary of Agriculture in connection with the agricultural appropriation bill. It was felt by the conference, however, that they shoud be presented in a comprehensive measure clearly setting forth the picture of an adequate national forest policy and proper Federal participation therein. By this means, with other efforts, the necessary private and state participation can best be shown and obtained.

The American Forestry Association, representing the public, was delegated to take charge of the educational campaign in the endeavor to secure the passage of the bill and will call upon the public and every interest con-

cerned for their approval of the bill and support in the endeavor to have it passed.

A week following the meeting of October 15, a conference of state foresters and forest educators was held for the purpose of discussing and working up a state forestry program. A fundamental statement was prepared and this will be submitted to foresters and educators not able to attend, for suggestions, and will then be considered by various organizations interested and concerned in the movement for a forestry program. They will give the state program the assistance needed to secure its enactment by state legislatures. At this conference those present were: Alfred Gaskill, State Forester of New Jersey; C. R. Pettis, State Forester of New York; Forrest H. Colby, State Forester of Maine; Philip W. Ayres, Society for Protection of New Hampshire Forests; Dr. J. W. Toumey, Dean, Yale Forest School; Prof. F. F. Moon, Dean, State College of Forestry, Syracuse; Ralph S. Hosmer, Department of Forestry, College of Agriculture, Ithaca, New York; J. G. Peters, Acting Chief, Branch of Forest Management, United States Forest Service; R. S. Kellogg, News Print Service Bureau; O. M. Porter, Assistant Secretary, American Paper and Pulp Association, and Hugh P. Baker, Secretary, American Paper and Pulp Association.

STATE FOREST POLICIES

THE Committee on Forest Conservation of the American Paper and Pulp Association presented at a meeting in Chicago, November 11-13, a report on state forest policies adopted after conferences with state foresters and educators. It was approved by the meeting and is as follows:

"The responsibility for the carrying out of a National Forest Policy, aside from the administration of government-owned lands, rests upon the State authorities and private owners, since under our form of government the control of corporate and private activities is retained primarily by the States, and is not delegated to the Federal Government.

"In order, therefore, to link up National, State and private activities in an effective program, it is necessary that the States in which forest land constitutes any considerable factor shall establish essential requirements in protecting timbered and cut-over land from fire, in reforesting denuded lands, and, where and to the extent necessary, in the cutting and removing of timber crops by such methods as will promote continuous production of timber on lands chiefly suitable therefor.

"With due regard for all interests concerned, based upon its own experience and study of the question, together with suggestions received from many prominent foresters, your Committee believes that an adequate and effective State Forest Policy should include the following principles and provisions:

"1. That all soil shall be made productive of the crop to which it is best adapted or for which there is the greatest public need.

"2. That while agriculture and forestry are based upon soil production, the methods necessary in forestry and the time involved are so different from those of agriculture that forestry demands an entirely different form of administration.

"3. That State Forest Policies shall be initiated and carried out in co-operation with the National Government and with private owners wherever and to the fullest extent possible.

"4. That State Forest Legislation shall establish general principles and procedure only and vest in a properly constituted and non-political body, acting through technically qualified representatives, the responsibility for the fixing of regulations and enforcing them.

"5. That the paramount and immediate consideration in any Forest Policy is the creation and maintenance of effective means for the prevention and control of fire on all forest lands of whatever ownership, and that every owner of forest land shall be required to conduct operations thereon in such a manner as to avoid creating a fire menace to adjacent property.

"6. That forest surveys, land classification, forest research and forest education shall be provided for.

"7. That there shall be such changes and adjustments in prevailing systems of taxation as will enable all forest lands to be equitably taxed thereunder, yet will not discourage the holding of private forest land for future crops without impairing local revenues.

"8. That the state, upon request, shall assist the private owner of forest lands to make them continuously productive through the preparation of working plans, supplying of planting material and supervision of silvicultural operations free of charge or at cost.

"9. That the state be empowered to take over at a fair valuation and administer as part of the system of public forests any land, which, after competent examination, is classified as suitable only for timber growth, in case the owner refuses to avail himself of the opportunities and assistance provided by the public to encourage forestry upon private lands.

"10. That the acquisition of forest land by the State is essential to a sound forest policy.

"11. That all State-owned forests shall be utilized for continuous production, both for direct returns in forest products and indirect returns in soil protection, game and recreation.

"12. That all State-owned forest property shall be capitalized upon the records of the administrative body so that all expenses in connection with the development thereof and returns therefrom may be accounted for on a business basis to the people of the state who furnish the funds for the undertaking and enjoy its results."

LIVE GAME AND FOREST RECREATION

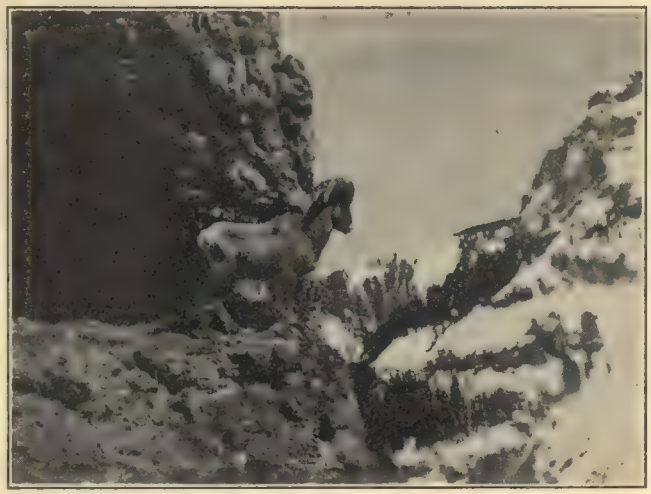
BY ARTHUR H. CARHART

PURPLE-GRAY shadows crept into the lake basin. Dusk's domain was invading the land that a moment since had been gorgeous with the flash of the sun's rays the instant before he climbed down behind Marvine peak. In silence the Traveler and I sat while he smoked his pipe and dreamily watched deep black shadows come up out of the depths of the lake to hide under the overhanging spruce trees until next day's sun should drive them back to watery fastnesses behind deep reefs in the lake.

"Saw some grouse today," remarked the Traveler, after a long meditative puff.

Another long pause ensued. A trout leaped desperately after a moth or fly and smacked the glassy water surface in his fall.

Then the Traveler made a remark which has come to my mind many times since and under many different conditions. "You know," he said softly, "if I could only see a bunch of wild elk or one flock of mountain sheep while I am out here and see nothing else all the time I am here I would feel that every cent I have put in this trip was repaid."



Photograph by Hosmer.

A BIGHORN BUCK IN THE UNCOMPAHGRE NATIONAL FOREST —SEEN AT HIS BEST, POISED ON A ROCK IN HIS NATURAL SETTING AMONG THE CRAGS AND PEAKS OF THE MOUNTAINS



Photograph by Christopher.

ONE GREAT RECREATION VALUE OF THE FOREST IS FOUND IN THE PRESENCE OF LIVING GAME, AND SOME MEN WOULD GLADLY TRAVEL FAR FOR A GOOD LOOK AT THESE MOUNTAIN SHEEP ON THE UNCAMPAHGRE NATIONAL FOREST

Figuring what I knew the Traveler was spending on his little outing quickly brought to me his value of that one look at a flock of native mountain sheep. It is hard to believe that a man would pay more than a dollar or so to see a wild bighorn in a cage or an elk in a zoo but the Traveler by his statement had valued that one glimpse of the sheep in their native setting at no less than five hundred dollars and knowing the Traveler I realized that it was his true valuation of a glimpse of a flock of bighorn.

Since the night the Traveler made this remark many like remarks have come to notice. Men have taken hard trips just for the chance of seeing a band of deer or elk. Others lucky in seeing a band have told, jubilantly, of their good fortune and still others have been disappointed deeply when they have failed to see any large game whatever in some of the mountain regions visited.

So there has been presented a problem in calculation which cannot be solved by rule of thumb nor by any one individual. And that problem is the actual value of living game as one of the features one may enjoy when visiting forest land on a vacation. For years the keen enjoyment of the hunt lured many men from desk and shop to spend days filled with long tramps, lively appetites and the joy of living. Game in the forest meant a motive for spending time each year in an outdoor life that netted not only trophies but better health and clearer vision.

Today big game may be taken still in many parts of the country but it has decreased in numbers to a point where it is a real task to bring home a set of antlers. The lake at which the Traveler camped was twenty years ago the very center of a population of elk, deer, sheep and other large game that literally overran the country. That remark passed the evening last fall when I sat at the door of the Traveler's tent meant



THE URGE TO SEE WILD ANIMALS IN THEIR NATIVE HAUNTS IS CERTAINLY INBORN IN MOST OF US AND MANY MEN HAVE TAKEN HARD TRIPS JUST FOR THE CHANCE OF SEEING A BAND OF DEER OR ELK OR STARTING A FAWN IN AN OPEN ASPEN PATCH

that after a ride which had covered every possible hiding place over a course of twenty miles for the day he had not seen one head of large game.

Many elements go to make up the values found in live game in recreation territory. The urge to see wild animals in their native haunts is certainly inborn in most individuals. There is a certain feeling of brotherhood when one is out in the field, knowing that he will not fire on game if he sees it, and suddenly surprises a doe and fawn comfortably housed in an aspen thicket. The life battle of the deer family is suggested when the mother deer starts, quick as a flash, to get the fawn and herself from harm's way. One cannot help but feel sympathy for an existence spent in protecting life itself. To one thus finding a wild thing which is harmless and yet mortally afraid of all living things of predatory nature comes a profound yearning for good fortune to follow the wilding. Life in the landscape brightens the outlook. Many years ago in the private parks of long forgotten princes peacocks preened and in the broader open spaces deer fed in peaceful security. In our modern parks are bears, deer, bison and many of the wild things of our native land which are kept there not only because of the interest from an educative and scientific standpoint but because of the livening of a certain section of the public grounds. It must be said in all candidness that with little or no exception the average park zoo falls far short of what could be accomplished in this particular field of use. The conventional iron fenced cages so detract from this effect that such people as the Traveler who any day in his home town might have, for a few cents street carfare, viewed the entire zoo of one of the parks of the city, will spend hundreds of dollars and feel fully repaid to see only one flock of sheep or a herd of elk for only a few moments.

The sprightliness of a scene which comes from the presence of wild life in the outlook cannot be over emphasized. I recall the pleasant thrill I received while visiting the Yellowstone when a big black bear mother with two cubs came to the edge of the river opposite the road on which we were traveling and leisurely looked us over.

As I write, my eye glancing from the window of this



DOCUMENTARY EVIDENCE THAT BIG GAME MAY STILL BE TAKEN IN SOME SECTIONS. BUT THIS RANGER HAS MADE A BIG KILL AND SUCH SKINS AS HE HAS TO SHOW ARE A RATHER UNUSUAL SIGHT TODAY

home in the hills, spies a little chipmunk, his mouth stuffed with grass, springing from one stone to another. The very snap of his motions adds a twinkle of life to a field already pleasing with asters, golden-rod and black-eyed susans. It matters little then whether the life in the scene is a chipmunk, a heard of elk, a black bear or a camp-robber jay, the essential feature is the presence of flesh and blood living things in scale with the outlook. Greater outlooks require big game in numbers to be in proportion while more intimate ones may be livened by small animals and birds.



HUNTING AND ITS ATTENDANT OUTDOOR LIFE APPEALS TO ALL SPORTSMEN AND IS THE MOTIVE FOR A GREAT USE OF THE FOREST LANDS. IT IS A FINE, CLEAN TYPE OF RECREATION, AND HAS AN ENTHUSIASTIC FOLLOWING

Forest lands that will be most used in the near future for recreation are the most accessible. On the edge of great areas that are still in a more wild state are broad stretches of land which have been used by local residents as hunting grounds for many years. Visitors too have stopped there because of the areas being readily reached. It is natural then that these lands first encountered and now the first to be used for recreation are not well stocked with game. The lack of wild game living in these areas reduces the recreational use directly in proportion to the aggregate return that might have been received by all visitors to this region in any given period if they had been able to see during this stay several species of the larger wild animals in their native homes.



THE FALLEN MONARCH. HE WAS A BEAUTY OF A CINNAMON BEAR, ONE AND A HALF YEARS OLD, AND MET HIS END ON THE SIERRA NATIONAL FOREST IN CALIFORNIA

Like the wild flowers that are prey of all recreation users who unthinkingly pull them out by the roots, even the lesser animals of the forest are disappearing. Chipmunks fall before the valiant rifle of some man out for a day of sport and a continual open season on squirrels and rabbits depletes their once plentiful ranks. In their place the timber squirrel and water ouzel are as important landscape values as a whole herd of deer.

So there is today a lack in some places of this livening of the view by wild things. Recreation grounds have their values in the total of the appeal they offer to the visitor. One great value is found in the presence of living game in the woods, not alone for the sport of hunt-

ing but for the use it may serve as interest points in an outlook. And it is a regrettable fact that the pursuit of game for sport has in many places reduced the presence of living game to a point where it no longer can be counted as an asset of any magnitude, economically, from a sport standpoint or in recreational value.

This is not in any sense an outburst against hunting in a general sense. No better fun can be had than a good clean hunting trip. There are still places where good hunting may be found and should be allowed with proper restrictions. The purpose of this is rather to call attention to a fact that has perhaps not been universally recog-



PHOTOGRAPH OF A CONY TAKEN BY GUARD HUPP NEAR TWIN SISTERS LOOKOUT STATION, ON THE NORTH PEAK OF TWIN SISTERS MOUNTAIN

nized. Game living has a direct landscape value and as such is a part of the recreation resource of the Forests. A live buck seen a dozen times a season by a score or more of people has a greater total value in the nation than a mounted head with dead eyes staring over a den full of skins, weapons and other mounted heads. Especially is this true in areas that are now more depleted of game than others for these are the areas that have been more used by man in the past and will be more used in the future for recreation.

All encouragement should be given to rational preservation and propagation of game animals in forest regions. The transplanting of large game from one forest to another where it formerly was plentiful but since has been killed out is worthy of universal commendation and the work done by the Forest Service in this field merits good support. The establishment of National



BIG GAME OF THE LONG AGO. THIS SHOWS A BUFFALO COW AND HER CALF, ONE DAY OLD, ON THE WICHITA NATIONAL FOREST IN OKLAHOMA

and State game preserves in those sections where game naturally propagates should be pushed more rapidly but only after a really thorough study of location of such areas is made. Too often local politics play no small part in the establishment of such a preserve. The service of the National Parks as game sanctuaries is of the finest sort and there truly one may see unafraid wild things. True sportsmen will welcome the work that will preserve species from extinction and will again stock the ranges where formerly game was plentiful. It is



THIS CAMP ROBBER IS MAKING HIMSELF THOROUGHLY AT HOME ON THE PREMISES. YELLOWSTONE NATIONAL PARK, WYOMING

only the "game-hog" who wishes to strip a region of all living wild life.

In the great recreational systems of the Nation are areas of many acres which will be used intensively for outdoor play. Those most used today and those which will be used more in the future now lack a great value that is found in the presence of living game. The establishment of game preserves and stocking of depleted ranges will add to these areas an element of life that will make no smaller part of the value in an area from a recreational standpoint.

When thinking of game do not always think at the same time of a high-power rifle. Think a part of the time of the fun of jumping a bunch of deer from an aspen flat and have them stand and stare at your intrusion before they trot away to another place of hiding. Think of the morning in the fall when the frost has nipped the aspen and has left a tingle in the atmosphere and the hike that morning which has as its outstanding feature the whirring flight of a flock of grouse. Live game has a charm, a grace that never is possessed by a dead carcass or stuffed heads, and the place it presents the greatest joy to the beholder is where it is truly wild and not trammeled by iron fences.

Game in forest land offers two major appeals to the recreation user. Hunting and its attendant outdoor life appeals to all sportsmen and is the motive for a great use of the forest lands for that type of recreation. But there is another feature perhaps little thought of but none the less present and important in the simple presence of living game in the landscape and there is little question but that the value of a live animal viewed by forest visitors several times during its life, has a greater aggregate worth in the recreation scheme than the same animal dead.

THE MASQUERADING MAPLE

THERE is one tree in the Arnold Arboretum which probably has been the subject of more good-natured disputes than all the rest of the foreign and domestic subjects in the big collection put together, says Mr. E. I. Farrington, in the *Boston Evening Transcript*. It is an exceedingly narrow tree, shooting straight up into the air, and with the branches hugging the trunk as closely as though they were strapped in that position. The argument chiefly indulged in by visitors concerns the identity of this tree, many of them contending that it is a Lombardy poplar, while others, somewhat more fully versed in arboreal lore, assert that it doesn't possess the characteristics of the poplar at all. The argument is not always settled even when the little aluminum label attached to one of the lower branches is read, because the words "*Acer saccharum monumentale*" may not mean much to the average person. Being interpreted, though, they disclose the fact that the odd-shaped tree is a sugar maple. It is often spoken of as the fastigate sugar maple, meaning that its growth is upright. It is, in point of fact, one of the narrowest trees known, and its appearance is strikingly distinct. Standing in a somewhat isolated position, although within the maple group, it looks like a sentinel on guard, and is so tall that it is readily observed by motorists on the main highway. Not infrequently remarks about its unique character are made by those who pass by and glance over the vine-covered stone wall. The tree is fully fifty feet high, but only a few feet in diameter, and it looks so little like an ordinary sugar maple that it is difficult for anyone to realize its claim to imitate kinship with that well known New England tree.

The parent tree was found growing in a cemetetry in Newton in 1885, and this, like all other similar trees now known, came as grafts from this Newton specimen, which seems to have appeared as a spontaneous freak of nature, it being understood that a natural freak is not always something unpleasant or amusing to look upon. This maple is really handsome, especially in the fall, when it takes on a brilliant coat of red and yellow. Trees of this form might well be substituted for the better known Lombardy poplar, for they have a much longer life, although not growing so rapidly. (See illustration shown on Contents page.)

FOREST FIRES IN NORWAY

ON June 19 one of the worst fires on record in the country broke out in the forest of Rendalen, Norway, about 180 miles northeast of Christiania. The fire started through the carelessness of some men who were in the woods. Swept by a heavy southern storm the fire spread rapidly over an extensive area.

Fifteen hundred to two thousand men, both civilians and military, fought the fire and for over fifteen hours their efforts seemed in vain, but, owing to the practical skill and tireless energy of these men, it was at last checked and then heavy rains setting in completely extinguished it.

The devastated area is estimated to be over six thousand acres and the damage is, unofficially, estimated to be sixty thousand pounds, sterling.

Other forest districts have been visited by fires lately, but on a more limited scale.

"TRIBUTE WHERE TRIBUTE IS DUE"

"DESPITE the heavy turnover in recent years there is more genuine *esprit de corps* in the Forest Service than in any organization, public or private, of like size in existence. For fifteen years the Service has thrived on it and there have been times when it has had little else to exist on. *Esprit de corps* to the Service might be likened to the rim of the wagon wheel, taking the knocks and bumps as they come, warding off the rocks, yet holding the structure firmly together and leaving a clear-cut, squared-edged imprint in the roadbed over which it travels."—District 2 *Review*.

A CHINESE trust controls the dye used on firecrackers, made from cibucao, a Philippine wood. The same dye is used for sealing wax and Chinese ink.

BLACK WALNUT FOR BEAUTY AND UTILITY

"IN connection with the most commendable campaign of memorial tree planting being so effectively conducted by your Association," says C. A. Reed, nut culturist of the Bureau of Plant Industry of the United States Department of Agriculture, in a recent letter, "may I call attention to the special fitness of the black walnut for such planting, for two reasons; its usefulness and value as a tree and because of the important part it played in winning the war?

"The black walnut is one of America's most useful trees. It is also one of the most widely distributed species, being found either native or planted from Middle New England to Northern Florida and from Montana to Texas. West of the Rockies and in the Southwest, wherever conditions of soil and moisture are favorable, relatives of the Eastern black walnut are among the more common indigenous species. The Eastern black walnut has been very successfully transplanted to the same sections, where it freely hybridizes with the ones already there, resulting in a very interesting type of crosses. In the interior valleys of California not infrequently brief stretches of macadam or concrete highways are shaded by rows of handsome trees either of the pendulous California black walnut species or of the typical Eastern black walnut or of the more vigorous and luxuriant type which is the offspring of these two when crossed together. The native black walnut is the only member of the *Juglans* group which has thus far proven its adaptability to any considerable portion of the United States.

The Persian or so-called English walnut annually produces a crop on the Pacific Coast valued at from ten to fifteen million dollars, but east of the Rocky Mountains it is of little importance, succeeding only under the most favorable conditions in certain restricted localities. The Japanese walnut is dwarfish in habit of growth, and while it has a wide range of adaptability and certain other commendable characteristics it rarely grows large enough to make a desirable shade tree.



A MAGNIFICENT SPECIMEN OF THE EASTERN BLACK WALNUT

This tree stands in Montgomery County, Maryland, and is believed to be over a hundred years old, and the largest of its kind in all the surrounding country. Fortunately, it was not called upon for "war" service.

"In time of war the black walnut, especially the Eastern species, is one of the first to be called into active participation. Indeed, we are informed that for many years before the recent conflict the German Government stealthily drew upon the American black walnut for gun stock material. During the period of American participation this species not only took part in the making of gun stocks but also in the manufacture of airplane propellers, which proved to be a far more important use. Walnut shells were used in the manufacture of carbon for gas masks, and to an unknown extent the kernels of the nuts were among the delicacies sent from home to the boys at the front.

"Both on the land and in the sky the black walnut played a most important role. It was probably employed



A MAGNIFICENT AVENUE OF BLACK WALNUT AT CHICO, CALIFORNIA

The native California black walnut is often effectively used along roadways and private driveways on the Pacific Coast, as its pendulous beauty gives dense and grateful shade. This is a beautiful planting.

in a greater variety of ways and for special purposes more exclusively than was any other single species. It may well be ranked with the heroes of the war, and as such it should not be forgotten in connection with the monuments being established for those who did not come back. So well did it perform its duty, and so important was its duty, that it might appropriately be called the Liberty tree.

"On the beautiful capitol grounds in Sacramento, California, there is a group of trees set out because of their historical interest. There is a red maple from Antietam, Maryland; a white elm from near McKinley's tomb, Canton, Ohio; a white ash from Vicksburg, Mississippi, and many others from equally distinctive points. These trees are studied with surpassing interest by visitors from many states and foreign lands. Could anything be more befitting to the memory to a fallen soldier than to plant a walnut tree grown from a nut produced at such historical points as these?



THE BLACK WALNUT—FRIEND OF MAN BY THE SIDE OF THE ROAD

A beautiful tree for roadside planting. This is the Eastern form and it is one of the most widely distributed of America's better class of native trees. With fertile soil and congenial climate, single specimens often develop trunk diameters of from three to four feet at breast height.

"There is a popular prejudice that the black walnut is a slow grower, but the fact is that in fertile, loamy soils underlayed with firm but not overly hard clay subsoils, moist yet well drained, it is one of the most rapid growing of America's more valuable forest trees. It should never be planted in coarse, gravelly, stiff heavy clay, or thin sandy soils. Preferably it should have only the most fertile soils, such as are typical of the alluvial sections in the Mississippi Valley. It is perhaps most common in the States of Kansas and Missouri, east to Michigan, Ohio, Kentucky and Tennessee. Splendid specimens are reported from Western North Carolina. Records and photographs are on file in the Department of Agriculture offices of individual trees on Long Island and on what is known as the Niagara Peninsula of Ontario, not far from Niagara Falls, which have trunk diameters at breast height of from three to four feet. Equally large or even larger specimens could doubtless be found in many other localities. During recent years nut tree nurserymen have developed and are now propagating three promising varieties of the Eastern black walnut. These are the Thomas, Stabler and Ohio, from Pennsyl-

vania, Maryland, and the State after which the last was named, respectively. The first was brought out during the early 90's, and where given intelligent care and attention it has produced liberal crops of nuts. The Stabler and Ohio are new sorts, but both are showing remarkable evidences of early bearing. All of these varieties are handsome in habit of growth, and have fine and rather dense foliage. The nuts are of average size and quality. Their chief point of superiority lies in the ease with which the kernels may be released from the shells after the nuts are cracked by ordinary methods. A very high percentage of the kernels may be extracted in unbroken halves. Frequently kernels of the Stabler are removed intact.

"Wherever the black walnut will succeed, it can be planted with entire propriety in private lawns,



THE CALIFORNIA BLACK WALNUT

The majestic beauty of this tree, as well as its high utilitarian value, is responsible for its selection as one of, if not the representative American tree. The planting of walnuts is earnestly urged.

public parks, along highways, in fence corners on the farm, and about farm buildings. Except for timber purposes, they should under no circumstances be planted nearer than twenty-five feet in any direction from large trees, and unless other trees nearby are to be subsequently removed, the young walnuts should be allowed fully fifty feet.

"Where nut production is desired, budded or grafted trees of the improved varieties will be found much more satisfactory than will seedlings or unbudded trees. Trees of the former type are available from but a few nurseries only. When they cannot be had, well grown seedlings three or four years of age and from three to six feet in height above ground may well be used. If for any reason trees of this class cannot be had, it will do to plant plump-meated nuts where the trees are to be grown. They will not all succeed, but if enough nuts are planted some trees will undoubtedly result and the returns will be incalculable. In transplanting the tap-root can safely be cut from two and one-half to three feet below the surface.

"It is not probable that the Forestry Association will need to be reminded of the importance of the part in winning the war placed upon this species by President Wilson, when he officially called upon the Boy Scouts of America to locate black walnut trees suitable for logs wherever they might be found. Surely readers have not forgotten the part the FORESTRY Magazine took in advertising the call and in recruiting the black walnut for duty overseas. Let us have more black walnut trees as memorials, not only to the men, but also to the trees which went to France and did not return; also let us have more of the spirit of the late Governor Hogg, of Texas, who, when on his death bed, expressed the wish that no monument of stone be erected to his memory, but that a walnut tree would be planted at the head of his grave and a pecan at the foot, and that when the trees matured and bore nuts they might be planted by the children of Texas, in order that there might be more trees and Texas a land of trees. While we are planting let us select useful trees best suited to our locality."

IN THE PINE WOOD

Where the pines make network
Of arms across the sky,
Here, dear love, the place to live,
Here, dear God, to die.
Blue the heavens sift to me,
Soft the wind sings of the sea,
Life is incense—Earth is good—
In the deep primeval wood.

Where trees hold attainment
Of growth up to the sky,
Home I come from crowded streets
When toil lets me by;
Here, dear love, we know life best.
When death comes to bid us rest,
Let us sleep where silence trod
Through the woods to speak with God.

—Edith Livingston Smith.

HOW A FOREST SERVICE MAN GOT RICH

HE started poor as the proverbial church mouse ten years ago. He has now retired with a comfortable fortune of $50,000. This money was acquired through industry, economy, conscientious effort to give full value, indomitable perseverance, and the death of an uncle who left him $49,999.50."—*Laboratory Bulletin.*

THE appointment of T. W. Norcross as Chief Engineer of the Forest Service, has been announced by Colonel W. B. Greeley, Chief of the Forest Service. Mr. Norcross succeeds Mr. O. C. Merrill, who resigned a short time ago to become Executive Secretary of the Federal Power Commission.

THE USES OF WOOD

WOOD IN THE TOY INDUSTRY

BY HU MAXWELL

MANY toys are made partly or wholly of metal, rubber, or celluloid, yet the use of wood for that purpose shows no tendency to decrease, but it probably increases from year to year in this country. The principal consideration which holds wood in its place as toy material is not cheapness, though that has something to do with it. Articles of large size would be too heavy if made of cast metal, and if of sheet metal, there is constant danger that the raw edges will become exposed and cut the hands of the child that plays with the toy. Many articles are made of wood because it is best, irrespective of cost or weight. Sleds are a good example of such. Some very handsome and serviceable sleds are of metal, but a visit to toy stores in winter will show that dozens of wooden toy sleds are sold to one of metal.



THINGS THAT ROLL

It is easily seen that the toys which are passing through this factory are intended to do much rolling as part of their duty in furnishing amusement for children in all parts of the country, and the story of how they are made is a very interesting one.

The story of this industry, told by statistics, is instructive. The following list gives the woods and their amount used annually in the United States in the manufacture of toys:

Wood	*Feet Used*	*Wood*	*Feet Used*
Basswood	8,739,242	Red gum	523,000
Maple	3,964,400	Cottonwood	257,000
Beech	3,221,506	Hemlock	241,000
Birch	3,123,950	Cypress	150,000
White pine	2,367,131	Sycamore	91,343
Elm	2,042,055	Butternut	10,000
Oak	1,444,057	Tupelo	5,000
Chestnut	966,268	Cherry	2,000
Ash	895,300	Spruce	1,300
Yellow poplar	882,000		
		Total	28,926,552

At first thought, it might seem that toys make up an aggregate mass, a miscellaneous collection without rank, order, or division, yet this is far from the fact. Toys fall into groups. The groups are not many, and the distinctions between them are pretty clear. Children are the arbiters of toy kinds and styles. They imitate what they see around them and toy makers recognize this fact and conform to it. At school the child sees objects of a particular kind and learns their use. The manufacturer supplies what the child wants by making a class of objects which may be designated as *educational*. Another class, imitating things seen in real life, is recognized as *architectural*.

A third has to do with trades and the tools and machines for carrying them on, and toys in that line are listed as belonging to that class.

A well defined group is based on the use of *musical instruments*.

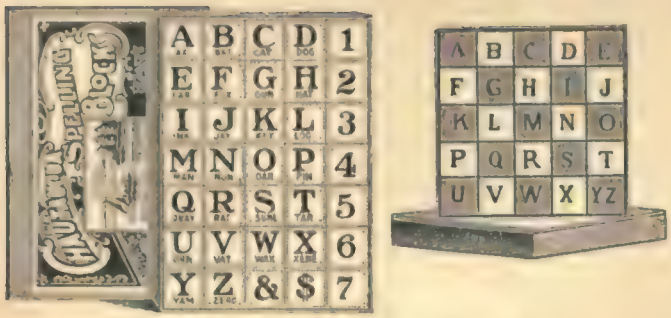
Boats, rafts, canoes, and such things as float and are useful have been responsible for toys based on *water craft*.

Children are familiar with furniture and they early recognize two classes, one for the kitchen and one for the living room, and these go under the list of *furniture toys*.

Animals, birds and creeping things form another class grouped as *natural history*.

Still another kind which is clearly defined is very common, and it belongs in the list of *games and amusements*.

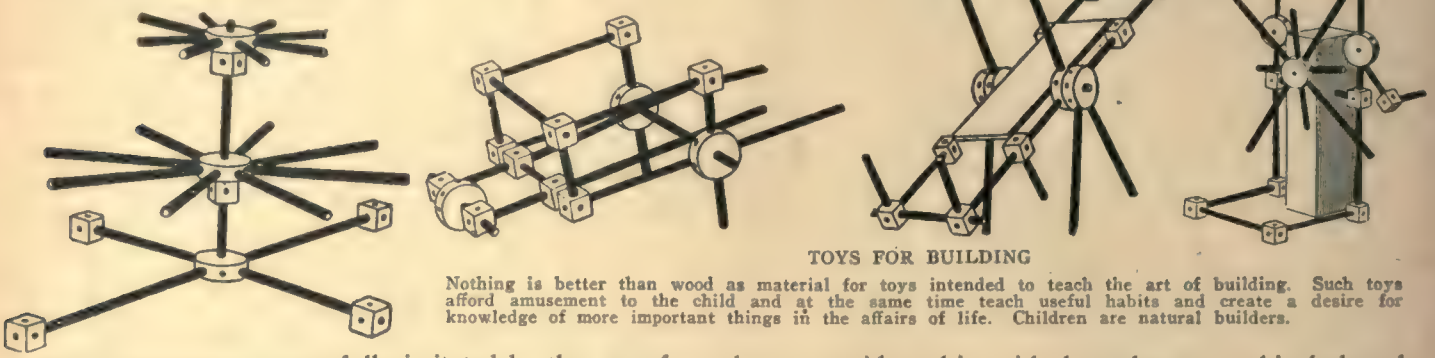
Each of these classes is entitled to special consideration, for they show the lines along which the child thinks and acts. The schoolhouse and its furniture



THE DELIGHT OF THE ABECEDARIAN

The A B C blocks and the children's work bench go together in providing work and play, and the beginnings of education. The outfit depends almost wholly upon wood, for nothing else has been found to take wood's place. Blocks are of basswood, red gum, tupelo, white pine, cedar and others that are light.

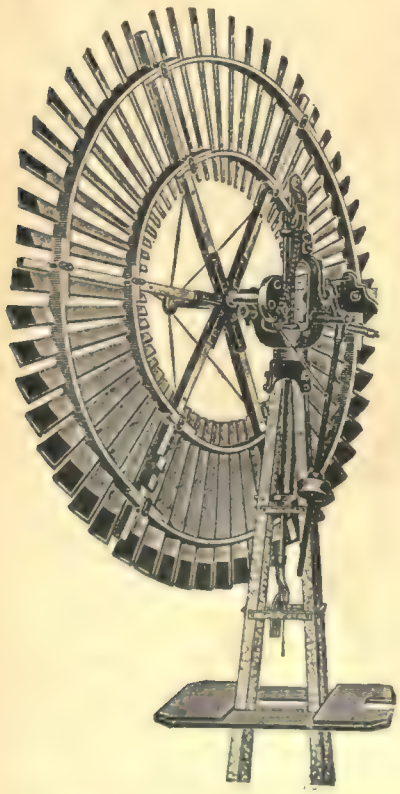
boards. Devices useful in learning the simple principles and fundamental operations of arithmetic are numerous, consisting generally of geometrical blocks. The young child amuses itself with these and gains some knowledge of their names and shapes. The abacus, a toy useful in learning addition, subtraction, multiplication, and division, is a favorite with children who find amusement while they learn arithmetic by the Chinese method. Some of the more pretentious toys based on the child's interest in school, are complex and include not only the funiture and appliances in the schoolroom, but the entire school-



TOYS FOR BUILDING

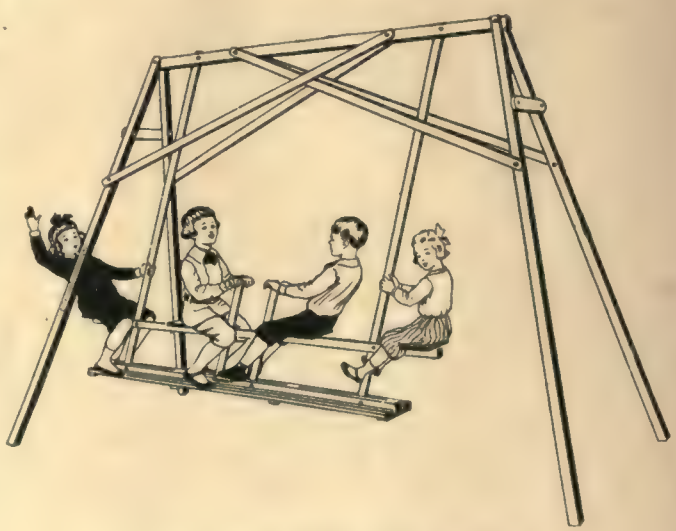
Nothing is better than wood as material for toys intended to teach the art of building. Such toys afford amusement to the child and at the same time teach useful habits and create a desire for knowledge of more important things in the affairs of life. Children are natural builders.

and apparatus are successfully imitated by the manufacturer of wooden toys. Most children who enjoy toys of that kind are not much, if any above the primary grades. The desk and the blackboard appear to be most frequently copied, and they are made in all sorts and combinations. Charts, of course, come in for liberal consideration, with their maps, pictures, and numbers, and color schemes, all patterned after the real objects that do service in the schoolroom. Sectional maps which are made by pasting on thin blocks of wood, cut in proper shape, maps printed on paper, are popular and possess considerable educational value, for the child is expected to fit each section in its appropriate place. But this toy comes above the primary grade. Rulers, erasers, and chalk boxes, all in miniature, go with the charts and blackhouse, outside and in, with the pedagogue at his desk and the classes before him. The complete schoolhouse just described might fall in another class which may be designated as architectural, for toys of that kind are intended to illustrate house and similar structures. Wood lends itself exceptionally well to toys of this kind. The structures are often made in sections, and the children find both amusement and instruction in placing the various parts together. The field is wide and the toy maker has fully occupied it. Nearly all kinds of structures have been copied, from the simplest footbridge or hut to the elaborate capitol and castle. Windmills are modeled upon the clumsy and archaic originals of Holland, and water-



AN IMITATION WINDMILL

A toy windmill may run by the force of the wind or it may not; but it affords amusement, and that is one of its chief purposes when it comes into the child's life. It suggests scenes on ranches where the wind blows and where horses and cattle roam at will about the ranges, and everything is outdoors.



THE LAWN SWING FOR CHILDREN

This is one of the larger toys in which children find amusement. It is not restricted to any particular size or age of the child. Except a few bolts and screws, the article is made wholly of wood, and a little paint adds the finishing touches. The toy maker puts to use many scraps of wood which otherwise would go to waste.

mills are built like the old frontier affairs, once common but now rare. Farm houses, barns, granaries, and other buildings suggest country life; and the counterpart of these is the village, with its streets, schools, churches, and stores. The railroad station, the wharf, the tunnel, and the bridge are duly copied or imitated. They are sometimes placed in the child's hands in complete form, but usually they are in blocks, and the child sorts out the blocks, fits them together, and constructs the objects in their entirety. He thus has the double pleasure of building and of seeing the work after it is done. The toy maker studies carefully the psychology of the child, and instruction and amusements are provided in healthful proportion. Styles of architecture are worked out in wood, finely shaped and nicely fitted. Norman towers, Gothic arches, Greek columns, Egyptian doorways and temples, Turkish minarets, Hindu pagodas, and the sagging roofs of Chinese edifices are all shown in the list of architectural toys. Color schemes are not overlooked and woods of different tints and shades are combined to give pleasing effect to finished buildings. The child's contact with work as it is carried on about him every day, sharpens his desire for something in imitation of the machines employed in trades and in business. Wagons are the most common objects in real life, and the most common in toyland. In size and fashion they are almost infinite, but every one is a model or an imitation of a vehicle used for business or pleasure. Though a toy cart may not weigh a quarter of a pound, it is intended to be a copy of a real vehicle. It is so with all sorts of little wagons. These are modeled after the delivery wagon which the butcher drives, or the grocer's, the express, or the heavy truck, and it would be difficult to find a child with a wagon who could not tell what kind it is. Most toy wagons are of wood, but it does not appear that the toyman has yet succeeded in making a wooden automobile, though he has provided railroad locomotives wholly of wood, from tender to cowcatcher; but they are not made to do much running under power other than a push or a pull. Fire fighting outfits lend themselves readily to wooden imitations, and toyshops are full of them. The engines are generally of metal, but the ladders and carts are of wood. Toy makers study the wants of the village or city child, rather than of those of the rural districts. That is doubtless because the largest sale of toys is in towns. The surroundings of country children may have something to do with the relative smallness of toys there. They need fewer artificial playthings because they have more real ones, such as lambs, cats, ducks,



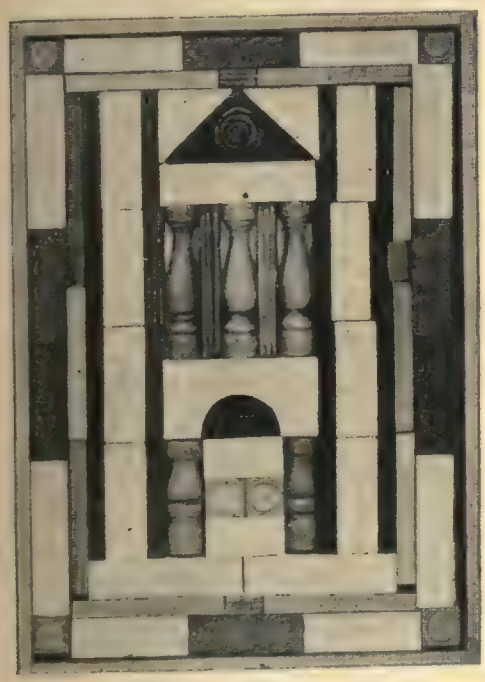
A CARRYING CASE FOR TOOLS

The boy sees a workman carrying a tool chest and he wants one for himself. Boy Scouts are the greatest tool carriers among children. The chest here shown is designed for carrying. It is of chestnut wood which is light, attractive in appearance, and has all the strength needed for practical purposes.



A BLACKBOARD FROM TOYLAND

Children do not always get as much blackboard at school as they want, and they make up the deficiency by equipping the play room at home with models somewhat like the real boards at school. The toy boards are of smooth, fairly hard wood that holds paint well and wears in a satisfactory manner.



TEACHING ORDERLY PLAY

Toy makers are generally careful to provide both the toys and a place in which to keep them; for it is a good business proposition to make the toys popular with parents as well as with children. That result is reached by providing a place for the playthings when not in use, thereby keeping them out from underfoot.



FOR THE KINDERGARTEN CLASS

Toy furniture may be highly useful, and a pretty large class of that kind is on the market and evidently finds buyers. It is a sort of connecting link between the home and the school. The principal difference between it and regular furniture is in size. Similar patterns and like materials prevail in both.

colts, calves, and real wagons and sleds in which they are privileged to ride with real horses to pull them. Toy tools are made more for the town child. The rakes, hoes, spades, lawnmowers, snow shovels, and hatchets are such as the town child sees about the yard and garden. No toy store exhibits miniature plows, harrows, cultivators, fanning mills, seed sowers, threshing machines, corn shellers, horse rakes, hay tedders, and other farm machines now so common in all rural communities. The reason why they are not made is that city children do not know what such things are, and would not buy them; but they are well acquainted with yards and gardens and take readily to tools the use of which they know. The same idea is carried out by the toy manufacturer in making barns and stables. They are such as are found

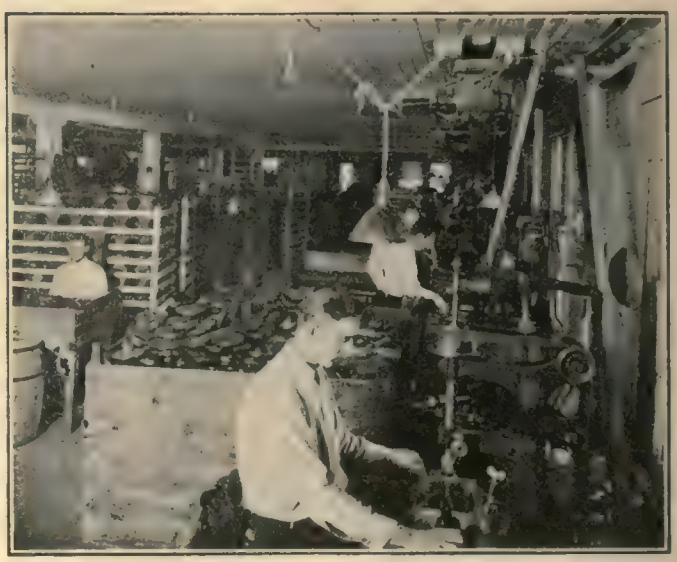


DRIVING SCREWS BY MACHINERY

Business comes before pleasure in the toy business, for while the toys are intended for pleasure after they reach the hands of the children, the manufacturing comes first, and that is a matter of the most serious business. Observe the power screw drivers.

in the city, not on the farm. The stores are full of toy stalls that hold one or two cows or a single horse, with the small hayloft above, and the small grain bin at the side; but the country barn with its more ample mows of hay, larger and more numerous stalls, and the dairy with its rows of stanchions for cows, are not found.

The list of wooden toy musical instruments is not long, for metal holds principal place, yet large numbers of a few kinds are made. Pianos lead, and toys of that kind range in size from the smallest that can be made to emit a sound from a vibrating string, up to instruments which approach the line which separates toys from real pianos. Wood, by its rigidity, lends itself well to taut cord instruments. A common one is the violin, and harps are occasionally seen. The wooden whistle, though it cannot justly claim to be a musical instrument, is quite common and is a favorite with children. It is made in styles almost innumerable, and the toy maker has exercised his ingenuity in producing tones and noises as numerous as the styles. A common class of toys which pretend to be musical, are based on the resonous qualities of small bars of dry, straight-grained wood, when struck with mallets. A modification of the whistle becomes a kind of flute or fife, formed of a wooden tube with a few stops and keys. The lowest in the scale of toy musical instruments is the rattle, a kind of forked stick with a clapper, modified in various ways to increase its range of tones, but all more or less distressing to adults, though highly delightful to children. Wood floats, and the toy inventor naturally turns to it as the material for all kinds of craft that ply on water. He has a wide range of subjects to pattern after. Noah's arks are favorites with children, and so numerous are the styles turned out that Noah himself would fail to recognize them as copies or imitations of the original, if such a thing as parading them in review before him were possible. Some toy vessels are skillfully made, and are graceful objects; but it is not so with the average Noah's ark in the toy shop. It is usually loaded with animals totally out of proportion to the size of the vessel, and so top-heavy is the craft that, if one like it were to attempt the deep, it would capsize so suddenly that the animals on board would quickly find themselves swimming for their lives. However, the number of such toys sold indicates that chil-



POWER DRILLS AT WORK

Toy makers in Europe do nearly everything by hand, but that process is too slow for the American toy factories. The kiddie car maker is here shown using the most up-to-date drilling machine to be had. That is a necessity in quantity production.

dren like them, and this proves the good judgment of the manufacturers who make them. Vessels more modern than Noah's ark are generally constructed on more correct, scientific principles by the makers of toys. Some are designed to float and they do it very nicely in ponds or rain puddles where children try them. Usually, however, toy vessels made for the water are of the smaller kinds, such as skiffs, canoes, catamarans, and whaleboats. The European war brought in the submarine as a popular model for toys. The small boats are usually cut out of a piece of solid wood, and the painter tries his skill on them. Paint on such toys serves a double purpose. It looks well and it keeps the wood dry and light. Most

toy boats are not intended for actual journeys on water, and if the child attempts to navigate them he is liable to meet disappointment when he sees them careen upon their beam ends, or perhaps whop over and float keel up. The kinds of boats that come to children from toyland are nearly as numerous as the carts and wagons. There are dugouts, canoes, skiffs, lighters, whaleboats, canal boats, barges, scows, dhows, yachts, schooners, steamers, and war vessels. In some of these a good deal of metal is employed, but others are wood.



ROUGH MATERIAL FOR TOYS

Measured and cut lumber constitutes one of the first and most important steps in the manufacture of toys, for without a good beginning it would be difficult to secure a satisfactory completion of the article which is to amuse and instruct the child.

Toy furniture is made in almost endless variety, yet it falls into two general classes, that suited to the living rooms, and that designed for the kitchen, laundry, and pantry. The makers find their models for both kinds in furniture stores, for the child is pleased with a copy of what he sees around him. Toy furniture is nearly all made of wood. It is produced in natural finish, or it is painted, varnished, fumed, or stained, exactly as real furniture is finished, but the toy is necessarily a cheap imitation. Some is of regular furniture woods, oak, birch, maple, cherry, basswood, mahogany, and gum, but a larger part of cheaper wood, like pine, fir, and spruce. Upholstered toy furniture is not common, because it is not much in demand. It is easily soiled and spoiled. For that reason, high grade parlor furniture is not much imitated in the toy shop. Bedroom and library suits are most popular, including tables, stands, chairs, bedsteads, dressers, chests of drawers, bookcases, and rockers. A class somewhat distinct from this is camp furniture, and pieces for porch, garden, and lawn. Some of the outdoor styles are strictly rustic, made of poles and pieces with the bark on. A considerable part of toy furniture is sawed in solid pieces from blocks, the principal tool for this work being a scroll saw. Articles of this kind are small, only a few inches high, while some of the other furniture classed as toys is of sufficient size to give it use. Therefore, the separating line between real and toy furniture is not always clearly drawn.



BEAUTY PARLOR IN A TOY FACTORY

Paint is a pretty important thing in a toy maker's shop, for one thing is always held to be important, and that is that the finished articles must look nice, and nothing can take the place of paint in adding this highly essential quality.

The second division of toy furniture and woodenware belongs to the kitchen and laundry, and here are again found faithful

copies of articles in the home. Plain wood is seen almost exclusively here, with little attempt to ornament or decorate. The idea of use prevails. Everything is for a purpose. There are coffee mills with which children can pulverize dry bread crumbs, bread boards, rolling pins, biscuit cutters, flour scoops, dough trays, and other utensils for pastry making. Meat pounders, chopping bowls, cream freezers, churns, butter molds, spoons, and paddles fill a large place in the child's domestic science. The more pretentious articles like ice boxes, cupboards, bread boxes, and sideboards, keep up the faithful imitation of what is found in well appointed kitchens and most of these creatures, the imaginative toy maker exercises his genius in designing and producing strange and uncouth caricatures of some of them, and makes others of form and features never seen on sea or land. Wood is the common material of this kind of toys; few are of metal or rubber. Jointed reptiles, birds, and amphibians, mounted usually on wheels, are so constructed that when trundled along, the body is made to move in all its articulations. This style is popular with children, and the toy artist employs abundance of bright paint to heighten the effect. Generally, toy animals of wood do not show much art. If not grotesque, which most of them are,



NEARING THE JOURNEY'S END

A few more finishing touches and these toys will be through the factory and ready for the shipping clerk. The stacks of empty and filled boxes indicate that the last stage in the shop has been reached and the hour for going is in sight, and one may imagine they are anxious to be on their way—for their mission is a happy one—to bring joy to children's hearts.

pantries. The child must have its laundry and the toy maker has provided the tubs, wringers, washboards, clotheshorses, mangles, and ironing boards. These articles are generally made in sizes sufficiently large to be of some service in laundrying the soiled linen of dolls.

Children are interested in animals and in all harmless things that run, fly, crawl, creep, swim, or walk, and the makers of toys have done some of their best work in that field. So numerous are the objects represented by toys that a list would supply a rollcall for menageries, zoological gardens, aquariums, aviaries, and barnyards. Not content with true representations of they are apt to be crude. This is doubtless owing to the low price at which they must be sold, for the purchaser of toys is seldom willing to pay the price necessary to procure a piece of respectable wood carving. Therefore, the animals are the product of jigsaws, gimlets, pegs, and paint brushes, or of a turning lathe and an auger. One popular style of animal toys consists of six pieces for each individual—head, body, legs. These are fitted together with auger holes and sockets, and the minor appendages, such as ears and tail, are tacked on. An attempt to paint these to show the animal's natural colors, gives them more educational value than some of the



PACKING FOR THE TRADE

And now the toy is complete. Somewhere in every toy factory is a room where the finished articles are brought together preparatory to sending them out to the final buyers, and the maker of wooden boxes and crates is here a man of importance, for he makes the shipping possible.

others have, which are bright green, yellow, blue, or red, which are colors not given by nature to any four-legged creature.

All toys are intended to furnish amusement, which is their primary purpose, but those heretofore described are based on resemblance to real objects which are possessed or employed by grown people, and to that extent the toys are educational or imitative. There are toys, however, which are intended to furnish fun and recreation, without regard to labors, trades, machines, or occupations of grown people. Some of these, it is true, are copied from recreations which parents find enjoyable; but the basic idea is amusement. Many sorts of games are in this class, and there are few harmless amusements indulged in by adults which are not remodeled to suit children. Among such toys are scenic railways, toboggans, tennis, croquet, ninepins, bowling, circus fixtures, dominos, checkers, chess, quoits, leap frog, and many more.

Sleds seem more properly to belong here than in the class with wagons, because a child's sled is strictly a thing to give amusement. Bows and arrows come under this caption also, and target artillery, all of which the toy manufacturer supplies. Rocking horses with all their modifications, including rocking goats, bears, and camels, and dozens of others, fall in the same class. Toy pool tables are almost a class by themselves, because their range in cost and size is so wide that it is difficult to draw the line between the toy and the real article. They belong to the most expensive class of toys, and they are sold in immense quantities.

Many of the toys sold in this country are made in foreign lands. Before the war Germany made a large part of the wooden toy mechanisms, such as jointed animals and building blocks for toy houses and other edifices. Other classes are manufactured in this country, among these being sleds, wagons, and tools. Handmade toys are comparatively rare, except that a good deal of the finish is done by hand, and all of the assembling of parts after they have been shaped or finished by machines. So



READY FOR SHIPPING

Not a shaving of wood or a scrap of paper is in sight to indicate that the packing of these toys has been finished and that these neat boxes each carries an object dear to the heart of some child. Let the imagination follow these boxes to their journeys' end.

numerous are the kinds of machines in use by toy makers that any minute description is impossible, and a fairly complete list is difficult to compile. The scroll saw and the lathe do much of the work, but many special tools are in use.

It may be stated as a general fact that American toy makers use hardwoods and those in Europe prefer softwoods, like pine, fir, and spruce. Sleds, which are largely of American make, are of maple, oak, birch, ash, hickory, and of several other tough woods; with pine or some other softwood for the body, or the board which forms the top. There is a class of toy animals covered with felt, wool, cotton, or some other fibre, which may be mounted on wheels. These have been chiefly of European make, and the wood, if concealed, is of poor grade, and it is often knotty even in the exposed parts. Toy wagons of the larger sizes are of tough woods and are made to stand considerable rough usage. The bodies are generally of pine, hemlock, cottonwood, or yellow poplar. Toys do not demand expensive woods, except in certain kinds where much use is expected, as with sleds and wagons. Certain parts of rocking horses should be of hardwood to give the requisite strength. The waste problem in toy making is not serious, because most of the pieces used are small and what is not suitable in one place may fit in another.

AUTHOR'S NOTE: The illustrations for this article were secured from various sources, but special credit for them is due to The Gould Manufacturing Company, Oshkosh, Wisconsin; The American Manufacturing Company, Falconer, New York, and The H. C. White Company, North Bennington, Vermont, all manufacturers of toys, to whom grateful acknowledgment is made.

VOCATIONAL FORESTRY EDUCATION

BY JAMES B. BERRY

PRIOR to the World War the vocational movement in the United States had been slowly taking form. School surveys in various parts of the country disclosed the fact that 90 per cent or the children left the elementary school without preparation for any definite job. Many of them entered what may be termed "blind-alley" jobs—places in the industrial world which offered neither preparation nor hope for the future.

But with the passage of the Vocational Education Act (Smith-Hughes) in 1917, a new impetus was given vocational education.

The instruction work in vocational forestry under this bill is divided between the fields of agriculture and of trades and industry; farm forestry and silvicultural subjects being considered a part of agriculture, wood-working, paper and pulp, timber treatment and similar lines being classed with trades and industry. For this reason the two phases of forestry will be considered separately.

In the field of agriculture the subject of farm forestry enters as an integral part of the course of instruction in vocational agriculture. During the past three years this work has developed rapidly as a vocational department of the high school, thousands of new departments being established each year. The boy may select a woodlot enterprise at the beginning of the school year during which he has his instruction in farm forestry. As the instruction progresses he develops his project study plan and decides upon the various operations needed to put his home enterprise into productive condition. He is then in a position to go into the woodlot and carry out in practice the provisions of his plan. It should be borne in mind that the supervised practice is a teaching method—learning by doing—to supplement the class-room instruction. Along the line of major enterprises in farm forestry there have been suggested the following: reorganization of the farm woodlot on a productive basis: the planting and management of waste lands; turpentine production for the South; maple syrup production for the North; basket willow growing; the production of nursery stock.

Minor enterprises are those which may be considered supplemental to major enterprises. For example, the treatment of fenceposts may form part of a fencing job in connection with an animal enterprise. The following minor enterprises are suggestive: the planting and care of shade and roadside trees; the preservative treatment of fence posts; the planting of a windbreak about a pasture or orchard; pruning and control measures for tree pests.

That the practice of forestry in the United States will be promoted as a result of the vocational education in agriculture must be admitted. To what extent, it is difficult to foretell. The possibilities are very bright, however. The obstacle to the progress of forestry has been the hard-headed lumberman who had no interest in forest production. Now there is an opportunity to work with the coming generation and, through the children, to reach the parents. This has been the keystone to success in agricultural education and will prove of no less value in promoting the practice of forestry.

Several forms of schools have been developed in connection with education in the trades and industries; namely, the day industrial school, the part-time school, the continuation school, and the evening school. Of these the part-time and evening school types will prove most adaptable to the industrial education in forestry. Under the part-time system two boys hold the same position—working alternate days or weeks. The teacher is the instructor in the class-room and the supervisor in the mill. The evening school is adapted to the needs of men already in industry who desire to prepare for advancement in their vocation. In connection with the paper and pulp industry either type of school may be developed, although the part-time school will serve the needs or boys of 14 to 18 years to better advantage than the evening school. In fact, many states now provide by

statute for the part-time education of children between 14 and 18. The same is true also of the sawmill and wood-working industries, and there is no reason why an evening school should not be developed in connection with every large wood-working establishment in the country.

Perhaps the best plan under which to carry on the vocational work in lumbering, surveying, cruising, wood manufacture and paper making would be for several teachers to work out from the State Forest School. If a short course of three months were thought advisable, one teacher would be able to conduct four schools during the year. Experts in the various phases of forestry might, under such a plan, be detailed from the United States Forest Service to different states to assist in these schools. The result would be a widening field of activity for the Forest Service and the State Schools, and would do more than any other factor to promote forest production and wood conservation in the United States.

"UNCLE BILL" SAYS "PLANT BLACK WALNUT"

COLONEL CROSBY, of Washington, D. C., better known to the Boy Scouts as "Uncle Bill," is devoting the "best" years of his long life to getting the Scouts and other boys and girls to plant some black walnut on the home place. He grew up in the magnificent hardwood forests east of Columbus, Ohio, where his boyhood was spent in the companionship of trees, which he has never lost.

During four years in the "Sixties" as a soldier boy in Virginia, Alabama, Georgia, Kentucky and Tennessee, and since as a business man and newspaper correspondent, he has continuously been a student, an observer, and writer about trees. "The black walnut," he says, "for stateliness and beauty has no superior and few equals. In point of general usefulness and utility it has no equal among the trees of all the world. It was because of its superiority as building material and its resistance to decay that it was first selected for destruction by the early settlers. Next it became the favorite wood for household ornamentation, and for furniture; with result that it was more sought after than any other American wood. And finally came the World War, when every gunmaker in the world set out to get walnut to make gunstocks out of, with the result that the walnut tree, of suitable size for timber has about disappeared."

Uncle Bill is going about asking the Scouts to gather every walnut they can find, store them up in damp sand in a box or barrel in the cellar and next spring plant them out in odd corners about the farm. The reason for not planting the seed this fall is that "Happy Jack," the gray squirrel, or "Chatter," the red squirrel, will almost surely smell them and dig them up when the ground is not frozen too hard.

He explains that the walnut requires a good deep soil supplied with abundant moisture such as found in depressions or along stream banks or bottoms. When started there the walnut makes a fairly rapid growth and in the course of a few years begins to bear a crop of nuts almost every year. The very dark wood is fitted for many uses about the farm or is readily salable for cabinet work and ornamental purposes. While it takes years to produce the valuable hardwood in merchantable sizes



"UNCLE BILLY" AND TWO OF HIS MANY ENTHUSIASTIC FRIENDS
This is Colonel Crosby, better known as "Uncle Bill" to the boys and girls of America.

meanwhile the tree is hardy, beautiful and profitable.

"My aim," says Uncle Bill, "is to restore the black walnut to the position which it formerly occupied over much of the Eastern United States as the King of American Trees."

TIMBER CONSERVATION IN WYOMING

BY QUINCY R. CRAFT

FIFTH from newest State, and one whose population is less per square mile (conservation resulting often from the demands of dense population) than any other State, Wyoming probably leads all other States in the proportion preservatively treated of the timber used, and of the timber cut, within the State. This is largely due to the fact that so great a proportion of the timber cut and timber used is in the form of ties. Since nearly all the timberland in the State is included within the National Forests, the proportion of its timberlands under forest management is perhaps as great as in any State. Less timber is cut in Wyoming than in any of the Western States except South Dakota, Utah and Nevada, yet more timber is treated than in any Western State except those on the Pacific Coast, and the proportion treated is greater than in these.

A pioneer in wood preservation, the Sheridan treating plant of the Burlington was installed in 1899, at a time when the Southern Pacific was the only other railroad in America that had a treating plant; and there were but seven plants owned by railroads when the Union Pacific built its Laramie plant in 1903. A score have been erected by railroads throughout the United States since 1903, including one by the Chicago and North Western at Riverton, Wyoming, in 1915.

Of the 1,746 miles of railroad in Wyoming, 1,460 miles, or 83 per cent, are operated by the three systems that have treating plants within the State. In equipment and management, these plants are among the best, and have a combined capacity of over 7,000 ties per day, or upwards of 2,000,000 a year. Incidentally, their geographical distribution, at north central, west central, and southeast points, is admirable for handling the tie products and meeting the timber preserving requirements of the State. Scarcity of tie cutters during the war period reduced the supply of ties below capacity, but running full time these plants should be able in three years to treat the ties required for renewals on all Wyoming trackage in a decade, and treat ties more than two-thirds of the time for the lines in other States. As a matter of fact, many thousands of ties for the lines of these companies in Nebraska are treated at the Wyoming plants.



JAM OF THIRTY THOUSAND TIES BEING DRIVEN DOWN BLACK'S FORK, WYOMING

Ties constitute in larger measure the treated timber products of Wyoming than of any other state. The Wyoming ties are mostly lodgepole pine and generally hewed and many thousands of the ties intended for the Nebraska companies are treated at Wyoming plants.

The Wyoming ties are nearly all lodgepole pine, and mostly hewed. Those from without the State, largely western yellow pine from the Black Hills for the Sheridan plant, Douglas fir and western larch from the northwest for the Riverton plant, and Douglas fir for the Laramie plant, are mainly sawed, with the exception of

large quantity of lodgepole hewed ties from the Uinta Mountains of northeast Utah, sent to the Laramie plant.

From the forester's point of view, Wyoming is the lodgepole pine State, since this is the most important species in seven of the eight National Forests of the State, and in four of these it comprises 80 per cent of the stand. In the other National Forest, the Teton, lodgepole will be conspicuous if not the chief species, whether sales are of tie or pulpwood material. Because of its occurrence in a region where other timber trees are less plentiful, and of its promise to restock through plentiful reproduction, this species merits and is receiving at present the closest study of foresters to determine how best to speed up the cutting cycle with a tree that grows so slowly.

The builders of the Wyoming treating plants are not sorry they began to practice conservation. The Union Pacific has added two more retorts to its plant at Laramie. Based on its experience at Sheridan, the Burlington built a five-retort plant at Galensburg, Illinois, in 1907. If proportionate application of this form of conservation were made throughout the country, a marked reduction in the drain on the forests would result, to the advantage both of users and of the public.



ONE OF THE LOADING PLANTS OF THE STANDARD TIMBER COMPANY

Here ties are delivered on cars of the Union Pacific Railroad, at Granger, Wyoming. Water transportation, by fluming or driving streams, and labor-saving equipment, are used in the largest way in Wyoming tie operations. At Riverton transverse conveyors carry the ties from the main conveyor to the individual piles.

FOREST FIRE LOSSES

TWO-THIRDS of Canada's forests have been destroyed by fire in the last 75 years, according to figures of the Forestry Department of Canada. The amount of timber burned would have supplied the world for 450 years at the present rate of consumption and represents a loss of a billion dollars.

Canada still has 1,900,000 square miles of forests, the forests of British Columbia constituting one of the two greatest tracts of commercial timber in the world, the other being in Russia.

Forest fires in this country are designated by Colonel W. B. Greeley, Forester, as "the chief cause of forest devastation" and he urges most emphatically the immediate need of a nation-wide drive against the forest fire.

Not only have great forest fires visited this country since the landing of Columbus but large tracts were swept clean of timber before a white man ever used an ax here. An eminent scientist and historian, according to the *American Lumberman,* states that if the discovery of America had been postponed five centuries, the discoverers would have landed on a treeless continent. Indians and lightning set these fires. The Indians were burning the woods to make pasture for deer and buffalo.

"IN Japan, all the wooded land is carefully guarded, practically every tree on the Government forest land is listed and not one is allowed to be cut down except with express permission of the Government, and then not unless another tree is at once planted in its place."—*Mountain Echo.*

"WE HAVE DESTROYED OUR FORESTS FAR

IMPORTANCE of putting the idle acres of the country to work growing trees continues to be one of the foremost topics for editorials by the newspapers and more and more the co-operation of the editors with the American Forestry Association is becoming felt throughout the country. The need of a national forest policy and for better fire protection has been taken up by publications for the first time in many instances now that the Association has put it before the editors as a business proposition not alone for themselves but for the country. Some of the editorial comment follows:

Kansas City Journal: It probably has not occurred to many persons that the forests of this country influence the price of shoes and the cost of roast beef for the family dinner. Yet, according to a statement by the American Forestry Association, this is the case. The situation is outlined tersely in the form of these questions:

"Do you know forest conditions of this country have a direct bearing on the price of your roast beef and the cost of your shoes?

"Do you know that other sections than the West must make up the deficiency in Western pasturage if the supply of live stock is to keep up with the increase in population?

"Do you know that the greatest economic problem that now confronts the United States is locked up in eight Southern States, including Texas?

"Do you know that 10,850,000 head of cattle can be pastured on idle land in the South within easy shipping distance of the manufacturing centers of population?"

With this as the basis, a plan is presented that it is believed will unlock that problem of the Southern States. The three solutions to the problem presented are livestock ranches, reforestation and livestock farms. In the matter of ranching on a large scale, it appears that there has already been a good start in the coastal plain in Florida, but elsewhere there is little doing. It ought to be explained that the big cattle ranches of inland Texas are included in the present West where there is a deficiency in grazing pasturage. What is considered is the coastal plain along the Gulf and the Atlantic shores.

But the problem would not be really solved even if the big ranches in that region were multiplied many times. If the forests are all cut off and not replaced in part, that fate following all such failures to provide for conservation of moisture and control of the rainfall, severe drouths and eventual relapse into something resembling a desert will follow.

So the combination of the other two plans, reforestation and livestock farming, seems to be the real solution that must be sought. Details are given of how this might be brought about, but it is made plain that the basis must be a systematic plan, and that there is urgent need of government aid and control in the matter. Briefly put, the problem is one that affects the nation as a whole, and the solution must be a matter of national co-operation.

More and more it is made clear that the fundamental problem of practically all existing national complications is that of forestry in some form; and reforestation on a nation-wide and scientific scale would go farther toward solving much of the present vexation than almost any other one thing that might be mentioned. With this plan well under way, the unraveling of the tangle would be well started.—Rochester Democrat Chronicle.

Florida Times Union: In the May number of the AMERICAN FORESTRY Magazine, Thomas P. Ivy, gives his conclusions drawn from a study of certain economic conditions and these conclusions are interesting to the South. They are in line with the words of D. F. Houston, on one of his reports when he was the head of the agricultural department, on the greater share this section would bear in the economic progress and prosperity of the country in the future.

We believe that Mr. Ivy states a truth when he says that the shortage of paper, consequent upon the smaller supply of pulpwood, and the high cost of building material proves that we have cut and destroyed our forests far below the margin of national security. The traditional belief that our national resources are inexhaustible has resulted in a reckless waste of those resources and the effects now seen are waking many out of that dream. The present prices of shoes and beef are a sign, Mr. Ivy reminds us, that other sections must make up the deficiency caused by the encroachments of agriculture upon the Western grazing lands if the supply of live stock is to keep pace with the increase in population. This is a position also supported by the figures given out from time to time by the United States Department of Agriculture. To quote Mr. Ivy:

"In casting about in search of a solution of the future supply of cattle and timber, the Southern States have attracted attention on account of the vast area of cutover lands there that has within it possibilities of the widest and highest value to the people of the whole United States because near the center of population. That part of the Southern States known as the Coastal Plain has conditions which are most favorable for the development of the cattle industry in conjunction with reforestation, provided there is applied to the problem a well defined national policy that will enable the owners of these lands through governmental financial aid to develop their holdings in accordance with their best possibilities."

The area of cutover lands in the coastal plain extending from Texas to North Carolina, and inclusive of those states, is about 108,500,000 acres. This is more than the combined area of Florida, Georgia and Alabama. On the lowest estimate, the writer computes, this area would pasture annually 10,850,000 head of cattle. Three-fifths of it could be made to grow timber at the rate of ten thousand board feet per acre at the end of a timber rotation of fifty years, in the meantime being available for turpentine operations.

On the basis of ten acres per head of cattle, it might be possible to profitably reforest this great area and also use it for grazing purposes, but our Southern forests do not grow grass profusely. But these cutover lands could and will, in the future, support great droves of the finest cattle the world ever saw—when the cattle tick is finally eradicated. Out of all the economic disturbances of the present the South will rise to an eminence as a provider for the world beyond the dreams of its oldest citizens. Producing cattle, cotton, sugar, oil, phosphates, naval stores and other valuable products beyond the measure of other sections, the South's wealth in the not very distant future will be enormous.

Atlanta Journal: In eight Southern states, Georgia included, there is locked up what the American Forestry Association considers the richest economic opportunity in America, an opportunity which if turned duly to account will solve some of the irksomest problems of the day. The coastal country from Texas to North Carolina contains 108,500,000 acres of cutover lands —nearly thirty per cent of the area of this entire region. Imagine the territory of Georgia, Florida and Alabama stripped of farms, orchards, cities and other improvements, and left to idleness. That is virtually the situation with this vast acreage of deforested lands. Capable in latent treasure of maintaining a population of many millions, it is now to all practical intents no better than the lost Atlantis.

National welfare no less than Southern interests, says the Forestry Association.

BELOW THE MARGIN OF NATIONAL SECURITY"

demands that these resources be unlocked and utilized. In the May number of its official magazine it points out that at the lowest estimate this area would pasture 10,850,000 head of cattle, or nearly one-sixth of the total number now in the United States. "At the same time," it adds, "three-fifths of these idle lands could be made to grow timber at the rate of 10,000 board feet per acre at the end of a timber rotation of fifty years, provided lumber be desired instead of pulpwood." As the first practical step the Association recommends a forest and soil survey in order that no time or means be wasted on efforts ill adapted to local conditions. "The second step would be for the government to broaden the Farm Loan Act so that financial assistance could be extended to the men engaged in converting a waste area into fields and forests that would produce food and shelter for one-sixth of the entire population of the United States."

These suggestions, be it observed, are not from imaginative "promoters," but from scientific students whose sole interest in the matter is the common country's well-being. Nor can anyone doubt the wisdom of their counsel if he will look into the facts of the nation's forestry problem and food-animal shortage, and then glance at the vast possibilities in the South's cut-over lands. The critically high prices of lumber, print paper and most other products derived from wood are evidence enough that unless something is done to replenish America's sorely depleted forest resources, conditions ere long will become desperate. Likewise the prices of meat, of dairy products, of leather and of goods manufactured therefrom are evidence enough that the utmost effort should be made to increase the production of these necessaries. In the cutover lands of Georgia and other Southern States lie the most readily available means of meeting these needs—a fact of almost immeasurable import.

Peoria Journal: In view of the soaring lumber prices and the unprecedented shortage of print paper, figures compiled by the American Forestry Association are interesting as emphasizing the rapidity with which our forests are disappearing. The investigation reveals that the New England States are no longer self-supporting in a lumber way, but Lake States, once the greatest producers of lumber, are now importing to keep alive the many wood using industries in that section and that the center of the lumber industry is rapidly moving to the Pacific coast. This, of course, means long hauls and high freight rates The supply of yellow pine in the south will be exhausted, at the present rate of consumption, in about fifteen years.

A feature of the war was Germany's destruction of French national forests which had stood for hundreds of years and in which no cutting had been allowed except by official permit. The needless loss roused the anger of Americans in France, and yet the area burned out in this country annually by forest fires far exceeds the destruction wrought overseas. The annual timber loss in the United States is approximately $28,000,000, and yet the nation manifests only passing interest in the efforts of the Federal and State Governments to prevent this appalling waste.

It is high time that all land owners should give heed to the rapid disappearance of forest trees and should do their part in however small a way to offset the scarcity of timber. There are few farms without some corner, ravine or untillable ground where crops cannot be raised that is suitable for trees. It is true that no early return would be realized on the investment of time and labor, but a concerted movement would do much to replace the timber that once covered such a large portion of our land. Even if science finds a substitute for wood pulp in the manufacture of paper, more trees will be needed to conserve some of the rainfall now drained off too rapidly.—Muncie (Ind.) Star.

FINE CO-OPERATION

An example of fine co-operation with the American Forestry Association is the following by P. J. V. M'Kian, in the Insurance News Department of the Chicago Herald Examiner:

The National Fire Protection Association is circulating a leaflet issued by the American Forestry Association on "Facts about Our Disappearing Forests," in which it is pointed out that fire destroys over $20,000,000 worth of timber every year and kills the reproduction upon thousands of acres of forest lands.

Attention is called to the fact that a single fire among young trees may not always kill them, but that it will check their growth and weaken them so far that they will be very susceptible to insect attacks and fungus diseases.

Plans have been worked out which aim to prevent forest fires from gaining headway, which is accomplished by means of patrols stationed along carefully laid out routes. During the last two years airplanes have supplemented the watchfulness of men on horseback, and this system has been extended to all the large areas of wooded land in the Pacific Coast States. Telephone and tool stations have also been established and operated in connection with lookout stations and broad fire lines, on which the accumulated debris has been burned.

Worcester Post: Charles Lathrop Pack, president of the American Forestry Association, calls our forests the backbone of all industry and cites some figures to prove it. Take a look at these facts and then indorse the Association's move to have Forest Preservation week multiplied by 52.

Ten years ago the United States produced its entire supply of pulp wood, but now two-thirds of it is imported. This means freight rates to be added to the purchase price.

Indications are that supplies of pulp wood timber in New England and New York will be exhausted in 10 to 20 years.

Ten years ago the United States produced its entire news print supply—now we import two-thirds of it.

Do you wonder that newspapers are fighting for their lives? Do you wonder what makes the cost of building a home so high?

Experts predict saw-log lumber will be gone in 50 years.

The bulk of the original supplies of yellow pine in the south will be gone in 10 years, and within seven years 3000 manufacturing plants there will go out of existence.

White pine in the Lake States is nearing exhaustion, and these States are paying $6,000,000 a year in freight bills to import timber.

New England, self-supporting in lumber 20 years ago, now has to import one-third of the amount used.

Fire destroys over $20,000,000 worth of timber every year and kills the reproduction upon thousands of acres of forest lands.

Trenton Advertiser: Depletion of the forests of the United States within 65 to 75 years with a resultant slump in all enterprise that depends wholly, or in part, on timber products can be averted if action is taken without further delay. This is the declaration of an authority on the subject—the American Forestry Association of Washington, D. C. Unless immediate forestry steps are taken—and taken in considerable magnitude—a serious situation will confront future generations. In fact, many boys and girls of today and some mature persons as well will live to see a time of embarrassment and distress unless radical moves are made to replace the trees that are now going so rapidly into the maw of manufacturing, the appetite of which grows with consumption and becomes all the more menacing as the supply decreases.

THE POETRY AND PROSE OF FRENCH FORESTS

BY WILLIAM H. SCHEIFLEY

THE French, in their appreciation of forests, seem to have inherited something akin to the Greek and Roman adoration of sylvan deities and the Druidic worship of trees. Such a feeling is early attested in the *Song of Roland,* the *Romances* of Chretien de Troyes, and the *Lays* of Marie de France; but it may be discerned in every epoch. Ronsard, writing in eulogy of the forest of Gastine, exclaims:

"Hearken, woodman; withhold the threatening stroke!
These are not trees you ruthlessly lay low.
For, see you not the blood distilled in pain
By nymphs who dwell beneath the hardy bark?"

Even during the seventeenth and eighteenth centuries, when attention was so largely focused upon the world of fashion as to obscure the previous sylvan enthusiasm of Rabelais, Charles Estiénne, Ronsard, Bernard Palissy, Olivier de Serres and Sully, men like La Fontaine and Buffon could not forget amid court frivolities their joy in the woodland. A certain Jesuit of the period, Jacques Vaniere (1664-1739), celebrating in his remarkable *Praedum Rusticum* the beauties of the forest, affirms:

"To the orchards, to the forests, your first cares are due.
Plant, plant, to begin with, if later you'd build."

Rousseau and the economists express an interest in forests both sentimental and practical, and Gregoire, a member of the National Convention, after depicting in his *Essai des Arbres de la Liberte* the devotion to trees in antiquity, gives an interesting account of the ceremonies connected with the planting of "Liberty Trees" during the Revolutionary period, 1789-1800—a custom revived in 1830 and 1848. The National Convention, believing the tree to be "the object which the French cherished most," decreed that it be planted in every commune and confided to the care of the citizens.

During the nineteenth century, in particular, the cult of the forest has flourished, trees having been extolled in poetry and prose for their beauty and age, as companions to man and silent witnesses of his achievements. "With the last tree," declares Michelet, "will disappear the last man." In the same vein, Chateaubriand affirms that "Wherever trees have disappeared, man has been punished for his lack of providence." Adolphe Rette exclaims:

"Sing praises to the trees that are so beautiful
And that rustle so softly in orchards and forests!"

Marcel Prevost holds that only the sea and the mountains can rival the forest in beauty. Paul Margueritte finds that "There is no season when we are not dazzled by the splendor of the forest." Taine, according to Maurice Barres, regarded his favorite planetree as a master in ethics. "How I love that tree!" he cries. "I never grow tired of admiring and interpreting it. During the months I spend in Paris, it is the goal of my walks. Every day, in all kinds of weather, I pay it a visit. It will be the friend and counselor of my declining years." Not less enthusiastic are the words of Francois Fabie:

"O chestnut trees, brave offspring of the Cevennes!
Within whose veins courses good Gallic blood!
You I revere as I would hold in awe the aged;
Rejoicing that in the sun, instead of pallid marble monuments,
You, noble trees, sturdy and strong, rise to heaven
As witnesses of the ancients among their descendants."

Still others have shown their enthusiasm for trees. Georges Lecomte vaunts in poetic prose the "surges of mysterious verdure, in which the Spirit of Darkness seeks concealment during the splendor of the day, only to envelop the earth again upon emerging: Edouard Schure greets his favorite fir trees with the words:

"Hail, invincible kings of heights untrodden!
Behold, youth encompasses you in torrents,
And you delight to thrill to balmy breezes
When Spring ferments beneath your green branches."

Lamartine pays homage to the autumnal woods:

"Hail, woods, crowned with a last vestige of verdure,
Your yellowing leaves on the meadows strewn!
Hail, last sweet days; the mourning of nature
Matches my grief yet charms my sight."

Lamartine could never forget the "majestic sycamores" that had afforded him shelter in the Holy Land. Henri de Regnier, who likens the sylvan splendor of autumn to a pyrotechnic display, avers that: "At Versailles, Autumn is sovereign. His scepter creates there a fairy land. In order to receive him, the trees adorn themselves in the richest and most sumptuous of colors, donning gold and purple, decking out the alleys and basins and filling the solitude with the splendor of their attire." Maurice Maeterlinck thinks that, "whether viewed by sunlight or moonlight, in the burning heat of summer or the white garb of winter, nothing is comparable to the architectural, altar-like alignment of innumerable trees, lifting heavenwards, smooth, rigid, clear-cut, crowded close like a bundle of lictors' rods." Sincere is the tribute of Gerard d'Houville to his adored maritime pines: "Lofty pines by the sea, extending toward heaven your wide-spreading, swaying summits, you abide in my memory, and embody the fondest dreams of my childhood." Charles Le Goffic sees in the twilight haze of Brittany towering, tapering poplars that resemble a ruined cathedral reduced to bare pillars.

In all this admiration of the forests may be discerned a tendency to personify trees as organisms endowed with animal or human traits. Emile Verhaeren sings of a woodland friend:

"That willow tree, I love it like a human friend.
.
Morning and evening and by night,
At every hour, indeed, I seek it eagerly."

Charles Doumier likens trees to "faithful guardians of the threshold," or "shepherds clothed in a green mantle." Gerard d'Houville confesses that when young he used to throw his arms about certain trees and press his cheeks against the bark, imagining that he could hear the beating of their hearts. Chateaubriand exclaims:

"Forests, stir gently in the breezes;
To whose eyes can you ever be so dear!"

Leon Dierx also seeks their company:

"It is to hear your music that I have fled the world,
O woods melodious, singing in the wind.
Never do I hearken to your sighs profound
But what my glowing heart is touched with holy awe."

Jean Richepin affirms that "trees are living personages." Camille Lemonnier, addressing an ancient oak, exclaims: "Ancestral tree, august Father, accept our veneration! For a thousand years you have greeted Phoebus as his chariot appeared in the east. You are a brother of the rivers, the mountains, and the plains." Brizeux, who desired to be buried beneath an oak, associates such trees with the Druids of old and the modern Bretons:

"Dream of the ancient gods, dream of the ancient priests,
Under the sacred oaks lie couched our great forefathers;
Open the hardy bark and you shall see again
A lovely Druid fair with golden sickle.

An oak a century old with splendid foliage,
A Breton hoary-haired in ripe old age—
These are twins, knotted, gnarled and hardy,
Two brothers both in pith and vigor rich."

Michelet, for whom trees are "monarchs of sorrow," declares that "in days of trouble we should seek consolation from the oaks, since they inspire fortitude." In certain regions of Northern France, says Paul Sebillot, trees standing near a house in which a death has occurred are regarded as having suffered a personal loss, and are draped in black. One of the most touching situations depicted by Henry Bordeaux is the scene in which M. Roquevillard, in grief, seeks consolation among the trees of his ancestors, leaning against an oak as "a brother of sorrows." And behold, the silent sylvan creatures, "a moment before so many anonymous units stood forth like personages"! Similarly, Francois de Curel, who regards the trees of his forest as loving confidants, likens to supermen those that tower above the others majestically. Analogous is the conception of Barbey d'Aurevilly, who speaks of such trees as "that final aristocracy destined like the human nobility to suffer destruction, and for the same reason." Anatole Le Braz, in lyric strains, interprets as if at the request of the oaks of Brittany their sentiments and aspirations. "Our hearts are sound," they say; "our faces uplifted, our foreheads proud."

Many French writers have been impressed by arboreal language and music. Verlaine declares with fervor:

"The white moon
Shines in the woods,
And from every branch
There sounds a voice."

Paul Fort delights to hear "that divine chanting in the branches of the oaks sounding in sonorous cadence their nuptials with the stars." Guillaume Apollinaire avers that

"The pines, sweet musicians,
Sing of ancient Yule-tides
To the autumnal evening winds,
Or, grown more grave, they chant
Incantations to the thundering heavens."

The music of the forest is vaunted by Charles Fremine in glowing epithets like "orchestre vegetal," "un chant large et pacifique," "la verte symphonie," and "les chenes sonores qui font passer comme un frisson d'Armures." Well known are the words of Alfred de Vigny:

"Observe that ancient trunk with roots immense;
Once it could speak in words divine."

Such has been the romantic apotheosis of the forests, especially during the past century. But are the poets alone in their appreciation? By no means! The utility of the forests has been demonstrated in peace and in war. In peace the pestilential marshlands of Gascony and Sologne have been converted at small cost into healthful prosperity; and in the Pyrenees and the Alps forestation has been observed to check erosion, to calm torrents, to prevent inundations, and to maintain the flow of springs. What the French did not fully understand was the strategic and industrial role of forests in war—a fact now brilliantly established. Competent judges hold that France was saved by her forests; since these, besides affording to her armies a defensive screen during the crucial days of the first invasion, enabled them to concentrate unobserved and to hurl the enemy back at the Marne, both in 1914 and in 1918. When the submarine checked importations of wood for military and industrial purposes, had it not been for the extensive timber reserves of France—the husbandings of half a century—the Allied armies might have been fatally handicapped. Little wonder that the eminent critic J. Demorlaine should declare that the forests of France played in the war a part as important as her canon.

But at what appalling cost was disaster averted! Her sylvan legions are mutilated or destroyed. It will take decades to make good her loss of twenty-five billion board feet. For the next forty years at least France must draw largely upon the forest domains of her colonies, and, as Henry S. Graves, our chief forester, has pointed out, her wood industries, affording employment to seven hundred thousand, must long suffer. Never, therefore, have sylviculture and reforestation been so necessary. Now is the time for lovers of trees to do their bit. Certainly, the fine spirit we have noted among writers of poetry and prose augurs well for the work. The admirable custom of planting trees along the highways, dating chiefly from the time of Henri Quatre and Sully, should be revived and extended.

Edmond Pilon, writing in *L'Opinion* for January 14, 1920, says that the recently founded *OEuvre des Chenes Celebres* (Society for the Culture of Celebrated Oaks) purposes, as one of its works, to plant trees in memory

of famous Frenchmen. The Society will begin in the gardens of the Invalides (or Military Museum), dedicating its first oak to General Gallieni, the military governor of Paris, who played a prominent part in the battle of the Marne. Among other well-known patriots destined to receive shortly arboreal monuments are Charles Peguy, Ernest Psichari and Guynemer. To be sure, the forest of Fontainebleau contains trees named for such popular heroes as Roland, Bayard, Turenne, Conde and Hoche, but these were not planted as commemorative monuments. The new custom, therefore, will assume a more personal form of national gratitude.

Octave Mans suggests that the *Ligue des Arbres* should organize pilgrimages to historic trees, just as now archaeological societies make trips to cathedrals. He would prepare, with the co-operation of the Touring Club, a classification of celebrated trees, to be posted in the schools. Thousands have admired, in the Paris Botanical Garden, the Lebanon cedar which, in 1735, Jussieu is said to have "brought back in his hat" from the Holy Land. In view of the lessons of the war, the French will heed the warning of Colbert, who expressed the fear that France might some day perish for want of wood. More than ever will they revere the names, too long forgotten, of Bernard Palissy and Olivier de Serres. They must take to heart the exhortations of Andre Theuriet:

"In the deepest of woods the nation keeps its heart;
A people without forests is a people that dies.
Hence whenever a tree succumbs,
Let us vow one and all to plant a successor upon its tomb,
And let us vow to reforest the denuded wastes
Where quick-rising floods swell into torrents
And the mountain sides are bitten bare by grazing sheep
And the rocks thrust forth like Nature's bones.
And may our children behold in future seasons
The robust branches of oaks and pines
Sway o'er the plain and flaunt their feecy foliage in the air
Like the fruitful tossing waves of the sea."

In addition to her depleted timber areas, France possesses fifteen million acres of waste lands awaiting afforestation. Aid from America in the form of nursery trees and seeds has already been gratefully accepted. The American Legion might well offer to participate in converting at least part of the battle-front into a "sacred forest."

MEMORIAL FORESTS—WHY NOT?

MEMORIAL trees have been planted by the hundreds in honor of the boys who fought in the Great War, and hundreds will be planted yet in their honor. But why stop with the planting of one tree in honor of each? Why not make it a half acre, or even more, for each, and bunch the planting to make a forest? We can call it whatever we may, a township, a municipal, a county or a community forest, letting it be distinctly understood that it is to serve as a memorial forever to those for whom planted.

All the arguments in favor of memorial trees apply in greater measure to the memorial forest. But the tree will be gone, in the course of two or three hundred years, at the most; the forest, rightly handled, will remain practically forever, even though individual trees come and go. Suppose we call to mind the city forest of Zurich, Switzerland, under continuous management since the Eleventh Century. Similarly, too, ours should not be a forest preserve with no harvesting of the products, but an area whose resources would contribute to the well-being of the people. I believe those in whose memory it exists would rather have it so.

Many persons who know tell us that France's trees played a powerful part in winning the war. Notice, however, that they pay tribute not to France's trees, as trees growing singly, but to the collection of trees, the forest.

This country needs more tree planting to make it a better place in which to live; trees can serve as memorials and serve the second end, too. But the country needs to have forests planted: let us not overlook the possibilities of the memorial forest.

REFORESTING WAR SWEPT REGIONS

THE following letter, acknowledging the receipt of seeds donated by the American Forestry Association to France, has been received by the Association from Ambassador Jusserand:

"I beg to say that my Government has taken all the necessary precaution for the receiving and proper utilization of the seeds so generously offered to us by your Association.

"Our Minister of Agriculture has given to the 'Conservator of Waters and Forests' at Rouen the necessary instructions for all the seeds to be sent, the moment they reach Havre, to the central warehouse of the Forest School we have at Nogent sur Vernission (Loiret), which will see to it that each lot reaches at the proper moment its definite destination.

"In the letter I have just received the Minister adds that most of the seeds of the Douglas Fir will be sent to the Departments of Aisne, Oise, Ardennes and Somme for the reforesting of the regions devastated by the war. The seeds of the leafy trees, such as oak, ash, poplar, will be sown this spring in the nurseries of the same school and of that at Nancy. The seedlings will be watched with care and it will be only when they are three or four years old that they will be planted in the regions appropriate for their growth. The results reached will be made known to this Embassy from time to time, and I shall keep you informed thereon.

"The Minister adds an expression of his desire that his feelings of deep gratitude and those of our Administration of Waters and Forests be conveyed to the American Forestry Association."

THE AMERICAN ANTELOPE

BY R. W. SHUFELDT

WE have no true antelopes in this country, as all the animals of that group—including the gazelles—are Old World species and especially of African habitat, where many interesting kinds are found. In the United States we find but one animal that in any way approaches the veritable antelopes in anatomy, form, and habits, and this is the well-known Pronghorn antelope, or, as it is almost universally known with us, simply the antelope. It has other names, however, for it has been called the Prongbuck, and, by the earlier settlers of the West, the Cabrit and Cabree. It is the sole representative of both the genus and the family, and it is safe to say that it is the only animal of its kind in existence. We have no fossil remains of any form closely related to it.



A FULL-GROWN MALE AMERICAN ANTELOPE

Figure 1. Drawn by the well-known British animal artist, J. Smit, for the Zoological Society of London. The long tail removed by the present writer, and the figure retouched. Only in the adult female does the horn grow to a length so as to be visible above the hair.

Of course, our antelope are now very rapidly disappearing, while formerly they were very numerous. Their present distribution, however, is generally given as occurring from the Mexican boundary, northward to the valley of the Saskatchewan (Lat. 53°), and on the plains from the Missouri River westward to the Rocky Mountains. In Washington and Oregon the Cascade Range formerly defined their extension in that direction; but in the absence of exact statistics on this question, I am not prepared to state over what areas of their former range—before they were molested by man—they may still be found.

Antelope, wherever met with, is purely an animal of the plains and open, rolling country, never being found in the timber, much less in the mountains. We have no history of its ever having been found east of the Mississippi River, and we possess no evidence of this kind through the discovery of fossil or subfossil remains in this region, nor in Indian mound-relics and tradition.

A full-grown buck antelope is smaller than any adult specimen of our American deer, and quite different from any of them in form. It has a big head, which is held erect upon a short, thickset neck. The body is robust and somewhat chunky. It has a very short tail, and rather short, slim limbs. Its small pointed hoofs are bifid and black, and its horns are peculiar, being situated on bony cores supported by the frontal bones, deciduous and hollow to the extent of admitting into them the aforesaid cores. These horns are perfectly black with whitish tips, and at the middle of each there springs a short, triangular snag in front. Below this, the horn is laterally compressed while it is cylindrical above it. Cutaneous glands and hair tufts are absent from the limbs, while they do occur singly over the flanks below, at the base of each ear, behind each hock, and a dorsal one; and each foot has an interdigital one—eleven in all. Beneath the eye, both the lacrymal gland and sinus are absent. Aside from numerous anatomical characters, it may be stated that in the mouth-parts the mucuous membrane and naked areas are coal black; the hair on the cheeks and top of head above the eyes, as well as the under side of the head, is white; face very dark brown—a color which also surrounds the white ears, and there is a patch of the same under each ear. Upper parts are yellowish brown, below, white. There is also a white spot behind either ear; the throat is white, and the two triangles on the front of the neck are likewise white. Rump white; legs ocre brown, and the tail white, with a dash of tawny on the upper side. All rudimentary hoofs are absent, and the eyes are black, large, and very expressive. The hair on the back of the neck is produced as a short mane. The length of the animal is four and a half feet, with height at the shoulder nearly five feet in full-grown males.

Judge Caton describes the topographical character of the antelope in great detail—perhaps some would say in greater detail than is necessary for so well known and so easily recognized an animal; but in this opinion I do not concur. It is very evident that the Judge was writing for all time and not simply to satisfy the popular taste of his day. For example, he says of the eye

that "it is larger than that of any other quadruped of its size. By a careful comparison of the living eye with the taxidermists' scale, to enable me to order eyes of the proper size for mounting specimens, I found it necessary to select the next to the largest. Indeed, the eye is very nearly the size of that of the elephant, and much larger than that of the horse or the ox." After recording much more about this organ, he says of the ear that "it always stands erect when the animal is standing at ease. When it becomes excited, the ears are projected forward to catch the least sound, which imparts a look of animation to the animal. The ear is five inches long, three inches broad at the widest part, terminates in a pretty sharp point, and is covered with hair inside and out."

The matter of the growth, development, and shedding of the horns of the American antelope has always been a question of decided interest. For a long time it was stoutly disputed that the animal shed its horns, and the subject constantly found its way into the sporting journals and magazines of popular natural history. I had the honor of being in at one of these, and the question arose by attention being called to it in a sporting magazine of the time, contributed by a retired officer of the Army. In a somewhat elaborate article, this writer strongly denied that the antelope ever shed its horns, and the editor of the aforesaid magazine invited me to take the matter up for him. My opinion was that his correspondent was wrong, as the shedding of the horns of this animal has now been known to science for many years, and has been carefully studied and described by a great many competent naturalists. Caton studied the entire process in his private deer parks years ago; it has been observed in the Zoological Society's Garden at London, and I have published a full account of it, giving illustrations showing the growth of the new horn.



A PAIR OF YOUNG ANTELOPES

Figure 2. This is reproduced from a published photograph in *Animal Life* made by Mr. W. Rau, of Philadelphia. The male is the one with the horns. They are difficult to rear in captivity.

Not satisfied with my answer, however, and turning to his copy of Audubon, as many a writer before him has done, to ascertain what he had to say on this point, he found that the "great bird man" agreed with him; so he published a rejoinder in the same magazine, which I met by the following: "Some people may be curious to know why I entitle this communication 'Sledge-hammer Science.' My excuse for doing so is that it came into my head when I read what the captain had to say about Audubon's method of 'proving' that the antelope does not shed its horns. It will be remembered that Audubon knocked off the horns of a buck antelope—not in the shedding season—to prove that Antilocapra did not shed those appendages, and this to a lot of hunters at old Fort Union many, many years ago! Now, although Audubon was a very distinguished pictorial ornithological artist, he was by no means a well-informed scientist, neither in ornithology nor mammalogy. There was altogether too much sledge-hammer science in his day, and there are those who are only too ready to use it in these days. Audubon might just as well have taken his hammer and knocked off the antlers of a bull elk in the wrong season, to prove that those enormous horns are not reproduced annually. Quoting a malobservation of Audubon's carries no weight with it at all, and in reference to the Fort Union episode, Caton says: 'The hunters were right and the scientist wrong; but we see how near Mr. Audubon came to discovering the truth. Had he been a little more patient in his investigations, and a little less wedded to preconceived opinions, he would have had the honor of this important discovery.'

"I wonder if your correspondent has ever opened a copy of Judge Caton's 'Antelope and Deer of America,' from which I have just quoted. If not, I would advise him to do so, and read the Judge's method of showing how Antilocapra sheds its horns. It is not the Audubonian method, but the true, scientific one; not the sledge-hammer method, but the one employed by the patient investigator. The entire process of this unique phenomenon exhibited on the part of our antelope was also carefully studied in the Zoological Gardens of London, in the case of a fine, healthy buck. Mr. W. A. Forbes, F. Z. S., gave an account of it, with beautiful

figures, in the Proceedings of that Society for 1880, and it fully sustains what Caton and many others have observed."

Although I have seen hundreds of antelope on the Western Plains, I am free to confess that I have never shot a buck in which the spikes on the head were in the condition represented by Forbes; moreover, I found but very few of the *shed* horns, yet I *did* find them—and good specimens; some animal or other undoubtedly makes away with them. The plainsmen used to say that porcupines were very fond of them.



Exceedingly curious in character is the coat of our antelope, each hair being hollow, pointed, and fragile; that is, when once bent it nearly breaks, and, owing to its non-elasticity, will not resume its straightness. A close coat of fine, white fur is found next the skin in this animal, and Caton noticed that "whenever it is excited in play, fright, or rage, the hair on the white patch on the rump rises up and assumes a more or less radial position from a central point on each side of the vertebræ, as we sometimes see two radial points on the human head." I would add that the antelope also erects the hair this way when in great pain, which I have observed in animals of this species that I have wounded and approached to kill. This erect and bristling bouquet of snow-white hair is truly a beautiful sight, and once seen it is not likely to be forgotten.

The antelope puts these white patches to another and a very different use. By raising them and *flashing* them, they are used as signals, and are so recognized by others within sight. Such a signal is given in times of danger, as when a man or any other enemy approaches, and this fact I have noticed many times on the plains; but so far as I am aware, it was first described in print by Thompson Seton, who had likewise observed it. The animals will also resort to it in parks where they are kept in a state of semi-domestication. In the case of a "bunch" on the prairie, the animal that discovers the approaching danger will stand still, turning his or her rump in such a way that all the other antelopes in sight can see it, be it but a doe or a single buck; by alternately raising and depressing the two areas of glistening white hair, the peril which threatens is indicated. Those apprised of the danger will repeat the signal, and sooner or later all of them will take advantage of it and seek a place of safety. It is remarkable how far such a signal can be seen—often very much farther than we can see the antelope itself, as the general color of the animal harmonizes so well with the surroundings. There is an excellent photograph of an antelope "flashing" in Stone and Cram's "American Animals," taken of a live animal on the plains. Female antelopes also develop a short pair of horns, ranging from one to two inches long; and we may detect the rudimentary horns of the male at birth, but not those of the female. As a rule, a female bears a pair of kids at a birth, but she may have only one; all of those I have seen leading young have had two. Doctor Rothrock, many years ago, found in the uterus of a slain female twins that were largely united, as is sometimes the case with animals and plants; but he saved only the skulls, and these were joined together just back of the orbits.





INTERESTING PHASES IN THE FORMATION OF THE HORNS

Figure 3. These are photographic copies by the writer from drawings by J. Smit, illustrating a paper by the late William Alexander Forbes, published in 1880. The upper left hand cut is a horn the day after the shedding of the old one, and the cut on the right is the same horn one month later. The head of the animal, which is drawn a little too elongate, shows the left side view of a male antelope one day after the shedding of the old horns.

On one occasion, I was hunting antelope some five or six miles north of Fort Fetterman, in Wyoming. It was early in October, and my success during the day had been wretched, for I had been tantalized several times by the sight of many antelope but had



THE HEAD OF AN OLD MALE AMERICAN ANTELOPE

Figure 4. This is the right side view, reduced, reproduced by photography from a brush sketch by the author. In this specimen the horns are not as high as they sometimes grow to be. (Compare with Figures 5 and 6.)

shot never a one. Being mounted on an excellent hunting horse, I came to the top of a low, rolling hill. Upon looking down into the shallow valley beyond, there lay nine antelope on the ground—all within two hundred yards. At the sight of me they all jumped up together, and the reader may imagine my surprise when I saw that the largest buck, a full-grown and splendid specimen, had jet black head and shoulders, while the coloration of the hair of the rest of his body was normal My brain reeled with excitement, for I would risk almost anything to obtain such a prize. Now, they were rested, while I and the horse were nearly tired out with the day's ride; so I hardly knew what to do, especially as they began to walk off at a rapid pace. Having often succeeded in a charge under such circumstances, I resolved to try it, and the spurt I made surprised the antelope, diminishing the distance between us in a trice by a hundred yards. Here I rapidly dismounted and let my horse go. Meanwhile my game had taken start, and actually flew up the side of a low, long, and narrow hill, some hundred and fifty yards beyond, where, instead of passing over its crest, they tore along at a steam-engine rate down the middle path of its summit. The black-headed buck was in the lead, the other eight following in single file. I had a heavy rifle, calibre .45, and with it I drew a fine sight on the object of my desire, who was going at such a pace that one could not keep his legs individualized. Then, holding fully three yards ahead of him, I pulled. Imagine my disappointment when I saw a noble doe immediately in his rear plunge to one side and roll down, stone dead! Dismounted as I was and completely leg-weary, my last chance was gone; and from that dav to this I have never seen or heard of such a specimen; indeed, a case of apparent melanism in an antelope—where the condition was confined to the head and shoulders—must certainly be one of the rarest occurrences in nature.

Once I was out with Lieutenant Merriam, of the Fourth Infantry; he was on foot and armed with a carbine. Upon ascending the slope of a low hill, over which, however, he could not see, some one beyond had started a bunch of fifty or sixty antelope. They rushed along the top of the hill immediately in his direction, reaching him just as they came to its summit. The surprise was profound—and mutual. The antelope, closely crowded together, whirled to one side, and he was not ten feet from them when he fired at the one directly in front of him. The ball not only killed it



DIRECT FRONT VIEW OF THE SKULL OF AN OLD MALE AMERICAN ANTELOPE

Figure 5. From a stuffed specimen prepared by the Arapahoe Indians collected by the Bureau of Ethnology and kindly loaned the writer by the United States National Museum. Note the asymmetry of horns and projecting orbital cavities.

outright, but passed through the bodies of two others, and these fell dead within a few feet of the first one. There they all lay—a buck and two does!

I had another experience with antelope when I was stationed at Fort Laramie, Wyoming, as post surgeon. Some ten or eleven miles from the fort we come to Laramie Peak—an isolated mountain known throughout the country. Beyond lay the Laramie Plains, noted in those days for the number of antelope found there, and for the fact that so few, either Indians or white men, ever visited the locality. It was in the autumn; we had not tasted venison for quite a while, and only a few of the officers cared to hunt very much. Lieutenant Rufus Brown, of the Fourth Infantry, and I did, however, and



A DIRECT SIDE VIEW OF THE SAME SKULL

Figure 6. Both cuts, as well as Figure 7, reproduced from photographs by the author. Note the marked circularity of the orbit, and the remarkably long coronoid process of the lower jaw.

one fine afternoon we arranged to go over to the Laramie Plains early the next morning, to see if we could not bag a few antelope, and, perhaps, a black-tail or two. Sergeant Conrad was ordered to accompany us—an excellent man and a fine shot. The poor fellow was shot some time afterward by road agents, when he was in charge of the squad with the paymaster's outfit—a most dastardly murder, several other men being ambushed with him on the same occasion.

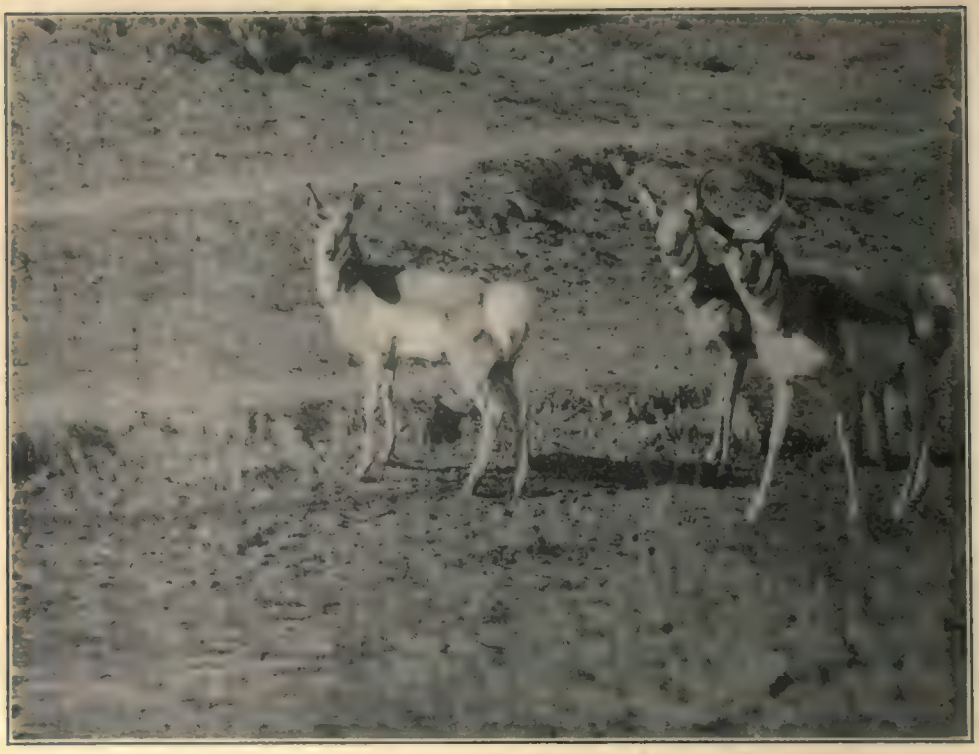
We three left at peep of day next morning, well mounted, well equipped, and with a fine lead mule. The early part of the afternoon found us on the other side of the mountain where the broad Laramie Plains begin, with weather and everything in our favor. We did little for the rest of the day beyond exploring in the immediate neighborhood of our camp. Plenty of antelope could be seen over the plains—single ones and bunches of them. We had determined not to do any serious hunting until next day, when we would make an early start, with fresh horses and all hands thoroughly rested. Although we had left hot weather behind us at the fort, it was a different story where we now found ourselves; and before sundown there was a very rapid decline in the temperature. So, after supper and about sundown, having picketed and looked out for the animals and put out the fires, we made up the bunks on the ground. After the fashion of an old soldier, the sergeant rolled himself up in his blanket about twenty feet from where Brown and I turned in together. We had a roll of gray army blankets, with a rubber one next the ground; and we needed both, for it fell below freezing-point before morning. Sleep? Oh no, we did not sleep! Like two rocks—that's all. It was a superb, starlit night, but no moon, and where we lay it was dark as pitch. I do not think I moved at all from the time we turned in until toward morning, and I am very sure the lieutenant did not. I awoke as daylight slowly crept upon us, and was instantly wide awake with all my faculties on the alert. Brown was flat on his back, snoring like a good fellow; and I expect his joints were quite as stiff as my own from the cold and the ride the day before. I felt for my carbine and revolver; they were close alongside where I had placed them when we turned in. Cautiously rais-



ANOTHER SKULL OF A MALE ANTELOPE

Figure 7. This shows the horn-cores, as they appear when their sheaths are removed. Loaned the writer by the United States National Museum, and photographed by him. Collected at Fort Griffin, Texas, by Dr. H. McEldery. A bullet-hole is seen in the forehead between and just in front of the horn-cores; the latter are sharp in front and rounded behind.

ing myself on my elbow, I saw that Brown's guns were where they belonged, too; and the sergeant looked in the dim light like an old walrus, rolled up in his blankets and sleeping on his side. Pretty soon my eyes became accustomed to the early morning light, and I could, without much difficulty, distinguish objects that were not too far off. I sat up and gave my eyes, face, and stiffened limbs a good rub, and this put the blood into circulation again. Brown never moved but kept on snoring. I was about to try for another snooze, and had come down on my elbow before lying down, when I thought I saw three whitish objects out on the prairie, which certainly appeared to be moving. Antelope, I



A BUCK AND TWO FEMALE AMERICAN ANTELOPES

Figure 8. This is as they appear on the open prairie. Photographed from life and presented to the author by the late Mr. A. C. Gould.

said to myself—and antelope they were, not over fifty yards off. Quietly I reached for my carbine and cocked it, but to shoot I would have to fire directly over Brown's body—use him as a rest, in fact. Two or three times I sighted, and finally I was sure I could plug the leading animal, an unusually fine buck. Glancing at my companion's face to make sure he would not bite his tongue off when the report came, I cracked away. Down went the buck! Off went the other two! Clean off the ground jumped Brown! On his feet in an instant was the sergeant—in fact, the camp was awake! A few words, however, soon explained things, and we all three walked over to where my game lay. He was not dead, while his immense eyes seemed to look defiantly at me. I took one of his horns in each hand with the view of moving him, so I could put him out of pain with my hunting-knife, when, to my surprise, he sprang to his feet, and with a twist of his powerful neck sent me flying head over heels. Then he stood and looked us over, but soon began to quiver at the knees, his body swayed, the white areas were raised on his rump, and in another moment he pitched over dead. I killed six more antelope that day, all "single stalks;" the sergeant killed several more; but Brown said I had given him such a shock at daylight that he could not hit anything.

The cutaneous glands mentioned earlier in the present article are found in both buck and doe, and are, at all seasons, responsible for the indescribable and pungent odor which emanates from these animals. I am unable to state what the exact use of the glands and their secretions may be, but it would seem that the odor might be useful in one way: to protect the animals from the swarms of troublesome insects, such as gnats, mosquitoes, and flies. Its short tail is useless for such purposes, and these pests are truly frightful on the plains sometimes. I have yet to see an antelope annoyed by them, while I have seen horses driven nearly distracted. The secretion does not affect or taint the animal, however, and antelope meat seems to be highly relished by everyone who has ever partaken of it.

In their feeding, prong-horns seem to confine themselves to the various grasses growing on the prairies, and never eat leaves or any kind of fruit. They are fond of "soda licks," so abundant in most of the regions they inhabit; but they will take common salt in lieu thereof. They make extremely engaging pets, and in reality this



A BUCK AND DOE

Figure 9. A very spirited and life-like picture showing the animals in the foreground alert and watchful while the others are feeding. Courtesy of the United States Cartridge Company.

is the only way we can fully study them. As the habits and morphology of the species have as yet by no means been exhausted, it is to be hoped that both science and private individuals will make constant endeavors to study them by such methods.

Every one who has ever hunted the antelope is aware of its fleetness for a short spurt, and how it then becomes fatigued and is even sometimes captured alive. While at Fort Laramie, I often saw these animals run down and taken with a pack of gaunt and vigorous greyhounds. In the chase they make some truly wonderful horizontal springs, but they fail utterly when they come to jump over anything a yard or more in height. During the rutting season the old bucks fight each other with all the lusty courage of yore, while the does never lack the necessary spirit to stoutly defend their young against



THOSE LIVING OF THE PIONEER SURVEYORS OF THE "TERRITORIES" WILL RECALL THIS SCENE

Figure 10. It is the right-hand third of a panoramic view of the "Glacial Lake and Moraines, on the New Fork of Green River—Wind River Mountains. Photograph by the author from Hayden's Twelfth Annual, United States Geological and Geographical Survey of the Territories. Specially selected to show the excellent running attitudes of the antelopes. From one of the most famous of the Government surveys, published in the early 80's.

any danger that threatens. Hunters also know how to take advantage of the almost insane curiosity these animals show when approached by any strange object on the feeding-grounds. The endeavor to inform himself on the salient points of a red flannel shirt waving in the air, has cost many an antelope his life, and I doubt very much whether any of them can tell a great deal about that garment today; I have induced them a number of times to approach me by simply lying on my back on the prairie and kicking my heels in the air.

Not a few of the early accounts of antelope hunting are very interesting, while others are, in some respects, quite remarkable. Here is one from an old work entitled, "Adventures of James C. Adams," which is quoted in *The Antelope and Deer of America*. It seems that Adams, together with a hunting-party of fifty men, struck a bunch of some fifty antelope out on the open prairie, where the grass grew to a considerable height. They surrounded the animals and soon closed in upon them, which caused them to become so bewildered that they were at a loss to know what to do. All they could do in their fright and amazement was to huddle together, or wheel about in circles, or stand and stamp their feet, as the danger they were in became more and more apparent to them. "In the meanwhile, taking care to keep our bodies concealed in the long grass, we had continued to approach; and being now within sixty yards of the panic-stricken animals, I rose upon my feet, took deliberate aim, and fired into their midst. Sykesey and Tuolumne followed the example, and the Indians discharged their arrows. I reloaded as quickly as possible and fired a second shot, then, dropping the rifle, pulled my revolver in my right and my bowie-knife in my left hand, rushed into the thick of the herd, which continued wheeling and tramping around in a circle, seeing themselves surrounded on all sides, and too much alarmed to fly. At the same time my comrades rushed forward, and we were all soon mixed up together—myself, the Indians, and the antelopes. Having discharged the shots of my pistol, I began plying my knife, and as the Indians used theirs, we wounded several that escaped our fire-arms. In the midst of the excitement a buck broke away from the herd, and was immediately followed by all that were able to get away, some dragging lamed limbs after them. As, however, six dead and five wounded lay before us, there was no use pursuing the flying band, and they were allowed to escape, although we might easily have procured a dozen more."

Until late in the 70's the Indians on the plains depended to no little extent on the antelope for meat—



A "BUNCH OF ANTELOPE" ON THE OPEN PRAIRIE

Figure 11. Photographically copied by the author from a colored plate in "Mammals of America" courtesy of The University Society, Incorporated, of New York City. The original is an elegant canvas by the famous animal painter, Carl Rungius.

when deer, elk, or prairie-dogs were not available. In those times nearly all the Indians possessed fire-arms, and many of them were excellent shots; but formerly they hunted them with bows and arrows, as referred to by Caton in the following words: "Our antelope was an essential article of food among the aborigines inhabiting the country which it frequented before the introduction of fire-arms among them. They had various modes of capturing it, chief among which was the bow and arrow. This mode involved the necessity of getting a very close range. This could only be done by some kind of artifice, or by the most skilful and cautious stalking, always remembering its defective eyesight, its acute senses of hearing and smelling, as well as its inordinate curiosity. The latter infirmity was taken advantage of by the savage, who, approaching the game as nearly as he safely could from behind the sage bushes or other concealing object, exhibiting in irregular motion a piece of the tanned skin of the animal, colored red or white, or some other attractive object, would attract the game. When the attention of the antelope is attracted by such an object alternately appearing and disappearing, its curiosity becomes excited, and an interesting struggle commences between that and its timidity; it will approach cautiously, then retreat a little, then prance around, drawing towards the object gradually, till it is finally brought within bow-shot. Then it was that the Indian would let fly his arrow from his concealment, or spring to his feet, the arrow to the string, and the bow partly drawn, and strike his victim before his fleetness could carry him beyond reach."

On a number of occasions our antelope has been kept in the paddocks or otherwise at the National Zoological Park with varying success. As a rule they do not breed under such conditions, and they frequently do not seem to either possess the desire or the power to have young.

Those who desire to carry the natural history of our antelope still further are referred to the interesting contributions to the subject by Dr. Murie, of England, and Dr. Canfield, who made his observations and experiments as long ago as April, 1828. Since his time many of our naturalists have devoted more or less literature to the life-history of this animal; while upon the other hand, various parts of its anatomy stand sadly in need of thorough examination and the results duly published.

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BOOK REVIEWS

A Guide to the Identification of Our More Useful Timbers. Herbert Stone, University Press, Cambridge.

A manual for the use of advanced forestry students, it gives information on certain points which are not easily accessible elsewhere. Two objects are kept in view—the observation of the characters of the different species and the utilization of those characters to discriminate between one species and another. The illustrations are restricted to figures which are deemed necessary where the critical detail can be seen only by means of the microscope or where such detail is a difference of degree and not of kind. The Generic numbers attached to the species correspond to the system by which the specimens of wood in the collection of the Harvard School of Forestry are arranged, thus making comparison ready and easy for the student.

Manual of the Timbers of the World. By Alexander L. Howard. The Macmillan Company, New York.

In his preface, the author says: "This book is not intended to supersede any of the works on timber hitherto published, but rather to supplement them. It has been put forward to meet a distinct want for a clearly-arranged handbook which shall contain information concerning all the timbers encountered in commerce, including those which have only of recent years appeared in the European market. The aim has been to treat the subject from its commercial, technical, and industrial aspects. In compiling this work I have adduced the practical experience of over forty years' work in the timber trade." The book itself is interestingly and practically arranged and beautifully made, and is a distinctly valuable addition to the forest literature.

A Tour of America's National Parks. By Henry Ottridge Reik, E. P. Dutton & Company, New York. Price, $4.00.

While not a guide book in the ordinary sense, this book contains much valuable information about railroad routes and suggested hotels, and it is as well a charmingly written description of America's great national playgrounds. The parks are treated separately, and very interestingly. The object of the book, as explained by the author in the preface, is to "attract more widespread attention to the wonderful natural beauty of our country; to point out the possibilities of a 'Grand Tour' here at home that shall embrace more of scenic beauty and more marvelous natural phenomena than was ever included in a 'Grand Tour' of Europe, and to make clear to those who have but a limited vacation period what is to be seen in the different parks and how best to see it."

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

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WOOD AND FOREST—By William Noyes	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette	2 50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.	2.50
MANUAL OF POISONOUS PLANTS—By L. H. Pammel	5.35
WOOD AND OTHER ORGANIC STRUCTURAL MATERIALS—Chas. H. Snow	5.00
EXERCISES IN FOREST MENSURATION—Winkenwerder and Clark	1.50
OUR NATIONAL FORESTS—H. D. Boerker	2.50
MANUAL OF TREE DISEASES—Howard Rankin	2.50
THE BOOK OF THE NATIONAL PARKS—By Robert Sterling Yard	3.10
THE STORY OF THE FOREST—By J. Gordon Dorrance	.65
FOREST MANAGEMENT—By A. B. Recknagel and John Bentley, Jr.	2.60
THE FOREST RANGER AND OTHER VERSE—By John Guthrie	1.60
TIMBER, ITS STRENGTH, SEASONING AND GRADING—By H. S. Betts	3.10
THE HISTORIC TREES OF MASSACHUSETTS—By J. R. Simmons	3 65
TIMBERS—AND THEIR USES—By Wrenn Winn	5.15
THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss	3.50
THE UNITED STATES FOREST POLICY—By John Ise	5.15
THE KILN DRYING OF LUMBER—By Harry D. Tiemann	4.65
MODERN PULP AND PAPER MAKING—By G. S. Witham, Sr.	6.15

*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

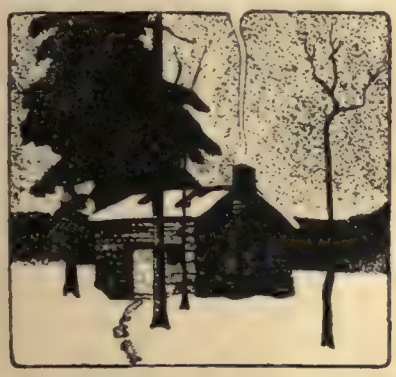
Conifers and Their Characteristics. By Charles Coleman-Rogers, The Macmillan Company, New York. Price, $7.50..

The author is the Chairman of the Forestry Committee of the Royal Agricultural Society of England, and reading his book is like walking through a great forest with a learned and agreeable friend. The trip itself is delightful and the information gained is well worth while. It is the work of an expert and contains a great amount of technical and scientific information, but it is nevertheless written in a manner that catches and holds the interest of the amateur nature observer. It is an invaluable aid for students and others in identifying the many different species of trees included in the category of the coniferae,

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Those who Have Already Contributed the American Forestry Magazine To Schools

Rufus A. Bullock, Emerson McMillin, Franklin MacVeagh, Edward L. Parker, Charlotte H. Bartol, Ellen F. Mason, Mrs. George T. Ford, Mrs. Z. Chafee, Eleanor W. Allen, Kendall F. Crocker, Mrs. J. P. Morgan, Jr., Mrs. G. C. Whitney, Louis M. Pratt, Mrs. John D. Guthrie, F. E. Thompson, Robert J. Fisher, H. R. Talcott, Mrs. Jeffrey Davis, Mrs. Bernard R. Green, William P. Wharton, Mrs. John D. Homans, Elizabeth G. Houghton.

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and it also gives in anecdotal form much reliable information concerning the various trees, stories of their cultivation and growth, their habits and habitats, and other matters of general interest connected with their life history.

Snapshots of the Wild. By F. St. Mars. J. B. Lippincott Company, Philadelphia.

By the author of "Pinion and Paw," "On Nature's Trail," "The Prowlers," etc., this book of first class animal stories will interest the reader from start to finish. Their arrangement in groups under the names of the months is unique, and is a splendid idea, and a good educational feature as well.

Manual of Tropical and Sub-Tropical Fruits. By Wilson Popenoe. The Macmillan Company, New York. Price, $5.00.

The unexploited fruit possibilities of the warm regions of the world are attracting a larger share of attention and capital every year. This book gives the results of the latest researches and practical experiences in cultivating the most promising fruits of these regions, excluding those already thoroughly exploited. Among the hundred or more fruits discussed are the following: The avocado, which seems destined to rank with the olive because of its high oil content; the cherimoya and the sapodilla, neglected and delicious fruits for table use; the guava, the mango, the Chinese litchi, the breadfruit, the loquat, the papaya and the jujube.

Technique of Practical Drawing. By Edward S. Pilsworth. The Macmillan Company, New York.

This is a splendid book for teachers, students and professional artists, to whom technique is a subject of especial importance. The artist who works for reproduction needs the benefit of full knowledge of technique, while with the painter whose picture is itself the final result, the question of technique is of moment only, as it enables him better to visualize his inspiration and obtain the effect of light and shade or form that he desires. With the artist who is drawing for the average commercial purpose or use, the picture is only the beginning of a series of manipulations and the question of technique is all important, because it must conform to the limitations of the various processes through which it passes after it leaves the artist's hands. Thus to the great majority of artists who earn their living, not by painting pictures, but through some connection with the graphic arts, reproductive technique is an imperative necessity and this outline of its basic requirements will be of invaluable practical assistance.

Camp Lore and Wood Craft, by Dan Beard. J. B. Lippincott Company, Philadelphia. Price $3.00.

This is another of the Woodcraft Series by the Big Scout who has done so much personally and individually to make familiar to American boys the ways of life in the out-of-doors. Profusely illustrated with sketches by the author, the many lessons on how to do things right when in the woods are clearly and interestingly given. The book will delight the heart of every lover of the out-of-doors—young or old—and will be eagerly seized upon by every American boy who wants to learn to do things as only that master of woodcraft—Dan Beard—can teach him to do them.



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A TRIP IN THE PISGAH NATIONAL FOREST

TELLING of an interesting trip taken with his two children, on horse back, in the Pisgah National Forest, in North Carolina, Clarence Lightner writes: "We were rather roughing it, and appreciated very much the maps, placed at such reasonable prices at the disposition of the public, issued by the Geological Survey. These were well and carefully made, but I am wondering whether up-to-date editions should not be made now? This with special reference to the Pisgah Quadrangle and the adjoining Saluda Quadrangle, where many changes in the roads have been made. In Pisgah Forest, I was impressed with the marvelous beauty and health giving properties of this reservation. Likely this is true also of Mt. Mitchell and other reservations.

"The usual approach to Pisgah Forest is from Candler, on the Murphy Railroad, from which a well-graded road climbs up the site of the new inn, which adjoins the lodge built there by Mr. George W. Vanderbilt during his lifetime. This inn first opened before entire completion in the latter part of July of this year, deserves special mention. Mr. Weston, who has the concession, and is managing the inn, has undoubtedly the right idea. The location of the inn, the equipment, and the treatment of guests, reminded me of El Tovar, at the Grand Canyon. Of course Mr. Weston is only beginning. The view from his location along the mountains, and across the Pink Beds, is certainly as delightful, though not perhaps as astonishing, as the view from El Tovar. I hope that Mr. Weston will not be discouraged in the work. I am confident that his returns this season will seem pretty poor in view of his expenses. But his inn is such an exception in the Carolina Mountains that I fear it will not be adequately appreciated.

"We were on horses, and under the intelligent leadership of Mrs. W. E. Ludlum (the fourth member of our party), we got next to the forest as well as the people and animals therein. I was disappointed, before leaving Tryon (our starting point) to learn that Pisgah Forest was being lumbered, and feared that the government had bought what nobody wanted. However, our visit in and through the forest changed my views decidedly. While Mr. Vanderbilt did make a contract, with a total of twenty years to run, the benefits of which are now being exercised by the Carr Lumber Company at Pisgah Forest, near Brevard, North Carolina, I believe that the removal of the large timber, as provided in this contract, will not ruin the forest area. It is true that, for the time being, the activities of the Carr Lumber Company seriously mar the pleasures of a visit to the forest, especially when one enters from the Brevard side of the forest, and finds the old trails injured, if not obliterated, in many cases, so that even for horse back riding things are not as good as they might be.

"I wonder whether the lumber company might not be induced to be a little more gentle in what they do with the forests. Perhaps we have to submit to the use of soft coal on the curious little logging roads, but when they are through with the roads they should at least take up the ties as well as the old rails, and level things off a little bit, removing perhaps the evidence of the sluices, or whatever they call the conduits for getting the logs down the mountains, so that nature can reassert itself without too much delay and agony. It was a pleasure to find that the forest ranger and his assistants—I think some fifteen in all, of whom we perhaps met five—were so generously disposed to aid visitors, as well as to protect the forests."

WHEN the forest lookout on Tahquitz Peak, in the San Jacinto district, California, was incapacitated this fall Mrs. Reindorp, wife of the district ranger, donned khaki, loaded blankets and grub on a horse, and took over his duties, holding the lookout post for more than a week. This is one of the incidents reported to the United States Department of Agriculture through the Forest Service.

SHADE trees and ornamental shrubs in the United States represent a value of one billion dollars, according to the estimate of the United States Department of Agriculture. Ten million dollars damage is done annually by shade-tree insects.

NATIONAL FORESTS IN GREAT BRITAIN

"LORD LOVAT gave me an interesting account of the purchasing and developing of the National Forests in Britain," writes Miss Emily Exley, who is well known as a landscape artist in Philadelphia, and who visited England last summer to learn at first hand of conditions and possibilities there. She continues: "At the outbreak of war National Forests did not exist in Britain. About 98 per cent of all woodlands were privately owned, with about 2 per cent owned by the King, known as Crown Lands. In 1919 the British Government made an appropriation of 3,500,000 pounds to be expended over a period of ten years—to buy and establish the National Forests, and in that same year about 500 acres had been bought and planted. The kinds of trees most generally used were the oak, ash, and beech in hardwoods and Norway spruce, Douglas fir, Japanese larch, thuga gigantia and Scotch firs in the evergreens. Lord Lovat also told me of the establishment of the Forestry Commission in Britain and the work they are planning to do on educational lines and the re-establishment of forests in Britain. A systematic scheme of education is felt to be the primary duty of all forestry authorities throughout the Empire." Miss Exley also said that the Roads of Remembrance Association of Great Britain was very pleased with the sample tree marker used by the American Forestry Association in marking memorial trees.

URGES REFORESTATION

REFORESTATION of state forests to take the place of the natural growth that has been removed by the lumber industries and farm development, is strongly urged by General C. C. Andrews, a pioneer in forestry and the only one of Minnesota's 22 colonels in the Civil War now living.

He stresses the need of new forest growth and, in an interview to the Duluth *News Tribune*, said:

"While there is still much pine timber of natural growth in Minnesota and always will be, the greater part has been removed. Under the amendment to the constitution adopted in 1914 about 300,000 acres of the state's public land have been set apart as state forest. Of the state's remaining public land perhaps twice as much more will be so set apart. Most of the timber on the land, however, has been sold or soon will be, and removed.

"To have state forests on a proper scale our state must buy third and fourth rate land and plant it with pine as rapidly as the work can be done in a business like way. Only about five per cent of the area of cut-over pine land that is third or fourth rate, will be found well restocked with valuable kinds of trees, by natural growth. The bare part should be planted with three or four year old nursery grown pines. To grow tall pine trees free from limbs to a

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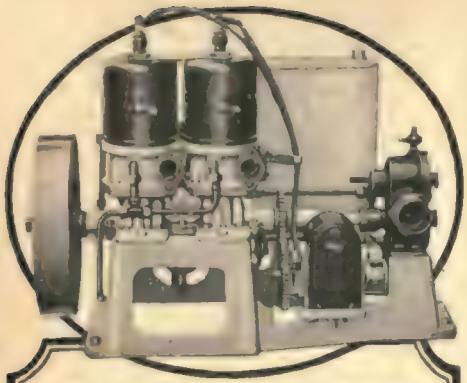
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height of from 40 to 60 feet they must be crowded when young and must therefore be planted about six feet apart, using 1,200 per acre. When about 80 years old they will have an average diameter of about 14 inches five feet from the ground. After that age the pine grows too slowly to earn good interest and is therefore cut in a normal forest.

"A normal forest is one from which enough timber can be removed every year for interest on the capital it represents, without impairing the capital. Nature will maintain it considerably by natural growth, but the areas not so restocked must be replanted. Before the great war, the German states planted annually, in the aggregate, 100,000 acres to maintain their state forests in normal condition."

TREES FROM SOUTH AMERICA

OWING to the unprecedented levels to which prices of railroad cross-ties have risen in this country, the Pennsylvania Railroad has decided to investigate the adaptability of the hard woods of Central and South America for this purpose. Inquiries have been started along several lines, not only to ascertain how much more cheaply ties, or the material for ties, can be purchased in those countries, but also to investigate the question of the longer life of ties made from the Southern hardwoods, as compared with those made from the North American native woods heretofore chiefly used. Under normal conditions, the Pennsylvania Railroad System uses from five million to six million cross-ties annually. White oak, the most desirable North American wood for this purpose, is becoming rapidly scarcer. The other available woods in this country have a very short life as ties, unless creosoted, which adds to their cost. The average net cost of railroad ties ready for placing in the roadbed has risen fully 100 per cent since the beginning of the war. Existing conditions now compel the railroad to seek out other markets for the purchase of its supply.

PLEASANT THINGS TAKEN FROM LETTERS TO THE EDITOR

"We take this opportunity to congratulate you upon your October issue of AMERICAN FORESTRY, which has just been received, and we wish you abundant success."

GLEN BROS. NURSERIES.

"I am with the Association with all my heart, and always was."

H. E. SCHMID.

"Our forests certainly need care and protection and I am pleased to know that there is an endeavor to watch over them. This is a noble work."

DR. F. C. HECKEL.

"We appreciate your magazine, which is filling a real need and is doing more to educate people to the proper utilization of our forests than any other instrument we now have, as far as I have any knowledge."

C. E. HAAK.

"I wish to add an expression of admiration of your magazine, which we have taken so long."

MISS LOUISA P. LORING.

"The arrival of publication dates of AMERICAN FORESTRY is looked forward to with keen interest by us here at the nursery, and we wish to congratulate you on the splendid work you are doing."

THE ELM CITY NURSERY COMPANY.

"It would seem to me that your Association should have the hearty support of every progressive farmer with a wood lot."

J. FORD SEMPERS.

"I feel guilty of an unfairness to myself for not sending in my check for membership before, for the architect cannot know too much about the source of the wood he constantly uses, and we all should be subscribing members at least."

G. W. BURKHEAD.

"You'll never be any more enthusiastic about saving the forests of America than I am right this minute, when I have just finished reading an issue of this wonderful magazine."

EDITOR, San Diego, California, *Sun*.

"I am glad to continue my subscription as I consider your efforts to keep forestry before the country fully as important as any issue that is now or likely to be in the future before the country."

GEORGE C. JOHNSON.

"I have just looked over and enjoyed the November issue of AMERICAN FORESTRY. I very much value the magazine and pass it on for others to read."

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THE GAS PUMP USEFUL IN FIGHTING FIRE

DURING the sessions of the Northeastern States Forest Fire Conference, held at Albany last February, several references were made by various speakers to the value of the gas pump in forest fire work. Mr. J. G. Peters, an official of the United States Forest Service, said: "Last summer we used for the first time one of the Fairbanks-Morse pumps. It was very satisfactory." Mr. Peters then proceeded to quote from a report he had on the large fires at Brown's Creek in Idaho: "For the next two weeks the gas pump ran splendidly and almost continuously day and night for the first two or three days. Undoubtedly the gas pump saved the day on Brown's Creek and prevented the loss of the plank road, the McGoldrick sawmill and logging camp and 10 or 15 million feet of timber. The road might possibly have been held with hand pumps, but it is doubtful. . . . Undoubtedly the gas pump can be used to advantage wherever a line is being held along a stream paralleled by a road, trail or fire line."

The use of such portable fire fighting equipment is quite general in Canada, two or three hundred of the Fairbanks-Morse outfits now being in use by lumber companies, railroads and the Dominion Government, and it is claimed that under severest tests they have given excellent service. The necessity for a lightweight portable pumping outfit, which can be easily carried to the nearest water supply in fighting forest fire is readily conceded. It makes sure the supply of water for the fire fighters, and can also be used to dampen down the fire so that the men can get closer up. Mr. Henry Sorgius, manager of the St. Maurice Forest Fire Protective Association, said that when they learned that experiments with mechanical pumping apparatus for fighting forest fires were under way, they immediately acquired such a pump and put it to practical use, supplementing the old fashioned equipment. He said that they found it necessary after the first season to have some minor changes made in the pump but that since then they have had no trouble whatever to start it or keep it going. They have now purchased several of these outfits and count them as one of their largest assets in fire fighting equipment. Mr. Sorgius said: "On two occasions last summer these pumps were a great help in saving two large storehouses when a bush fire was threatening to destroy them. We find it also very economical to run, as it will run for one hour on a gallon of gasoline." The pump can be used for backfiring and controlling slash burning operations as well as actual fire fighting.

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DOMESTIC EXPORT

PAPER FROM VENEER WASTE

IN the wood waste from veneer factories the United States Forest Products Laboratory sees considerable raw material suitable for the manufacture of high grades of paper. The cores of many kinds of veneer logs, now used in a large part for fuel, would make excellent pulpwood. In addition, a large part of the clippings and small veneer waste, which amount to one-fifth of the total veneer cut, probably could be turned into pulp stock with profit.

Among the veneer woods whose waste has papermaking possibilities are red gum, yellow poplar, cottonwood, birch, tupelo, basswood and beech. Many veneer factories cutting these species are already within shipping distance of pulp mills. In certain other cases, veneer factories are so grouped that they might furnish pulp wood enough to warrant the erection of a centrally-located mill. Other economic factors being favorable, such a mill could profitably operate on a daily supply of veneer waste equivalent to 50 cords of ordinary pulpwood. Of course, the construction of a mill should be undertaken only upon the advice of a competent mill engineer after a careful survey of local conditions.

ZION NATIONAL PARK DEDICATED

THE formal dedication of Zion National Park, Utah, to the American people was held on September 15, Stephen T. Mather, Director of the National Park Service presiding. Congress created the Zion Park, November 19, 1919, making it the nineteenth member of the National Park System. The area has been reserved since 1909, and was first known as the Mukuntuweap National Monument, and later as the Zion National Monument. Governor Simon Bamberger and United States Senators Reed, Smoot and William H. King solemnized the occasion with appropriate addresses.

Zion National Park is in extreme Southwestern Utah. It is reached by rail from both Salt Lake City and Los Angeles by the Salt Lake Route to Lund, thence by motor stage a distance of a hundred miles. It is also reached by motor from either Salt Lake City or Los Angeles over the Arrowhead Trail.

The park contains 120 square miles of 76,800 acres. Zion Canyon is the most important scenic feature, bisecting the park from north to south, it is 15 miles in length varying in width from 50 to 2,500 feet, with walls 800 to 2,000 feet high. A well known writer says: "This canyon, winding like a snake, abounding in enormous peaks and domes, and glowing like a Roman sash, is one of the most striking spectacles which even America has to offer." Because of its gorgeous coloring, Zion has been called the "Rainbow of the Desert."

Although the newest of our National Parks, Zion is only new in presentation as an attraction for the traveler and lover of the marvelous in nature. Geologically speaking, it is perhaps millions of years old, historically probably thousands. Only this year ruins of the Cliff dwellings of a pre-historic race have been discovered in almost inaccessible places in the canyon walls. The Mormon pioneers were the first of our time to discover the region, entering in 1858. In 1861, Brigham Young visited the region and named the canyon Little Zion. Captain C. E. Dutton, the celebrated geologist, wrote, "No wonder the fierce Mormon zealot who named it was reminded of the Great Zion on which his fervent thoughts were bent, of houses not built with hands, eternal in the heavens." Major Powell, noted explorer of the Grand Canyon, visited the region in 1870. Captain Dutton studied it several years later.

However, until the coming of the railroad and the motor road, few persons had ever seen the region. Elevated to parkhood, Zion has come into its own.



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STATE NEWS

ALASKA

THAT the turning to Alaska on the part of pulp and paper manufacturers seeking a new source of pulp wood will not only hasten the development of the territory but will greatly stimulate timber sale business on the two National Forests located in Alaska is the belief of United States Forest Service officials, as expressed in a recent bulletin sent out by the Service from its Alaskan station. The official records show that during the past 15 years more than 444 million feet of timber has been sold from the Alaskan National Forests. Including the fiscal year ended last June, a total of $178,918.98 has been received by the territory from forest business on the two National Forests since the Forests were established. Twenty-five per cent of this money may be used for road and school purposes. An increase in these funds which would come from increased forest business, will be of great benefit in the development of the territory.

THE $26,730.37 which has come to Alaska from the receipts from forest business on the Chugach and Tongass National Forests for the fiscal year ended June 30 makes a total amount of $178,918.98 received by the territory from this source since the forests were established, according to figures just furnished by Forest officials.

This money, 25 per cent of the total receipts from National Forest business, goes into the road and school funds of the counties in which the forests are located; but in the case of Alaska, which has no counties, the funds may be used for road or school purposes by the territory in any part of Alaska.

That the turning to Alaska on the part of pulp and paper manufacturers seeking a new source of pulp wood will not only hasten the development of the territory, but will greatly stimulate timber sale business on the two National Forests located in Alaska is the belief of the Forest officials. The official records show that during the past fifteen years over 444 million feet, board measure, of timber has been sold from the Alaskan National Forests. Increased forest business will return to the territory more money for roads and schools, and these annual payments constitute one of the continuous benefits assured Alaska by the location of National Forests within her boundaries.

KENTUCKY

W. C. HANNA, State Commissioner of Agriculture, who has recently come in charge of the Forestry Department, has announced that several kinds of trees may be had free from the State nurseries for the digging and removing. If any one wishes to have trees shipped to him, he may receive them by paying the actual shipping and wrapping costs. This is a good opportunity for Kentuckians to procure beautiful trees for their roadways and lawns.

The following species of trees are offered: White maple, sugar maple, birch, dogwood, redbud, elm, white oak, black oak, walnut, wild cherry, willow, catalpa, locust, cherry oak, pine, tulip poplar. Any one desiring information concerning the trees may write to W. C. Hanna, Commissioner of Agriculture, Frankfort.

MICHIGAN

MICHIGAN'S ninth forest preserve—the Lake Michigan State Forest, located in Emmet County—was formally opened October 1, according to Marcus Schaaf, state forester. This tract is located on Cecil Bay, seven miles from Carp Lake, and comprises 3,000 acres. Mr. Schaaf, whose headquarters are at Grayling, is now searching for a practical woodsman to take charge of the preserve. The state is resuming its pre-war policy this year, of opening two new preserves annually. The other preserve to be established this year is a 9,000-acre tract in Montmorency County. The state now has 600,000 acres in its preserves.

NEW YORK

THE New York State Forestry Association is planning a big forestry dinner, which is to be held at the Waldorf-Astoria in New York City on December 16. A large, enthusiastic gathering is expected and "A Guide to Action" is to be the general subject of discussion, for it is expected that the dinner will develop suggestions to be followed later in the formulation of the Association's legislative program to be brought before the coming session of the Legislature. The organization's slogan—"New York's Forests—A Heritage and A Hope" is inspiring, as indicating the enthusiastic spirit behind the enterprise.

FOREST FIRE LOSSES DURING 1920

NO loss of timber or equipment has occurred in the territory comprising several million acres protected by 66 wardens maintained by the Western Forestry and Conservation Association, and in general the forest fire loss in the Northwest has been less this year than last. Washington has had 754 fires in 1920 against 847 in 1919 and lost less than 42,000,000 feet of timber, compared to 60,000,000 feet last year. Of the 754 fires, 120 were due to campers, 74 to lighting, 60 to cigarettes. There have been an unusual number of lightning fires in Oregon this year but less loss th last year. The same is true of Montana and of other western states.

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FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

A GENERAL study of fire damage to forest land in California has been conducted during the last six months under the auspices of a committee representing all of the forest interests of the state. Professor Donald Bruce, the University representative, reports that definite progress has been made towards a knowledge of the fundamentals of the fire problem in California as a result of trips taken by the members of the committee to investigate burned-over areas in the pine region.

The committee at its first meeting went unanimously on record in favor of keeping all fires out of forests during the dry season and announced that its objective is the formulation of a protective system that will both prevent material loss to mature timber and result in a minimum of damage to the productive capacity of forest soil at a minimum expense. Toward that end, it proposes to analyze and weigh all existing evidence on the following points:

Effect of fire on mature timber.

Effect of fire on young timber and on its rate of growth.

The value of advance reproduction.

The damage to timber by insects and the effect of fire thereon.

The cost of protective measures.

Another co-operative project of great interest is the one in connection with the proposed Redwood Park. A committee consisting of representatives from the Forest Service, the State Board of Forestry and the Forest School is to investigate and report on the lands in the coast redwood region most suitable for inclusion in a national Redwood Park. The Save the Redwoods League and the National Park Service have requested that this examination be made in the near future. Professor Woodbridge Metcalf is the Forest School representative on this committee.

COLORADO AGRICULTURAL COLLEGE, DEPARTMENT OF FORESTRY

THE new ranger course in the Colorado Agriculture College has been introduced this fall with seven students entering. The course is of high school grade under the administration of the preparatory department of the college.

The object is to fit men to be forest rangers or as woods foremen. The students may enter college and take the professional forestry course, or agriculture, upon completion of their three year preparatory course and one extra year of preparation. But the majority of students in the preparatory department come from rural districts, take elementary courses chiefly in agriculture, and return to the farm at completion of the course.

Those taking the ranger course will be trained in agriculture as a major and in forestry as a minor, since at present the ranger usually graduates from forestry into ranching after some years of service on the National Forests. The preparation for forestry work offered in the School of Agriculture should yield fine results. The facilities for this instruction in the Colorado Agricultural College are excellent.

NEW YORK STATE COLLEGE OF FORESTRY AT SYRACUSE

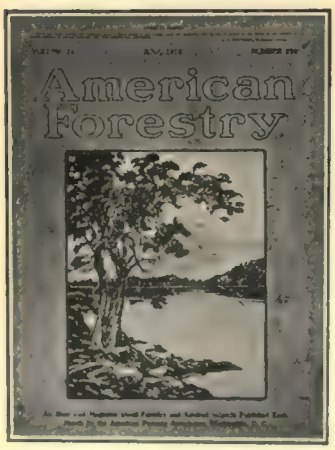
THE United States Forest Service has need for 2,500 forest rangers at once and the United States Board of Vocational Education has been asked to supply for this service as many partially disabled soldiers as are fitted for this rigorous out of door work, particularly those who, having been gassed, need out door air if they are to regain their strength.

The New York State College of Forestry at Syracuse has been asked by the voca-

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WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C.

GRADUATE of the Ranger Course of the Lincoln Memorial University, Harrogate, Tennessee, wishes to secure work as a forest ranger or guard. Twenty-four years old. Address Box 965, care American Forestry, Washington, D. C. (11-1-21)

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C.

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WANTED an Assistant City Forester, must have had some technical training and sufficient practical experience to direct the work in a city of 150,000. Answering give all information necessary for immediate consideration of application. Box 970, American Forestry Magazine.

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tional education board to assist in training large numbers of these men, both in secondary and collegiate courses.

The trustees of the college have authorized courses for these men, both at the college at Syracuse, and at the state ranger school at Wanakena, a school giving secondary forestry education, but this assistance to the soldier is contingent upon the approval of the state legislature of a building program to house the men in the woods at Wanakena.

CONFERENCE ON FORESTRY EDUCATION

AN important conference on education in forestry will be held in New Haven on December 17 and 18 of the present year. The work of the conference will take the form of reports from a number of committees, each reporting on a certain phase of the subject. The entire subject will be covered by the various committees who are now working on their reports. All foresters and employers of foresters interested in this subject and who can arrange to do so, should attend the conference and participate in its activities.

FIGHTING THE BLISTER RUST

EXPERIMENTS in the warfare against the white pine blister rust, which are being carried on both in the east and in the central west, begin to point the way to better methods of attack. Such is the report of E. G. Cheyney, head of the forestry division of the Department of Agriculture, University of Minnesota.

The white pine blister rust, like the black stem rust of wheat, is kept alive and spread by a plant ally of the disease. The group of plants aiding the blister rust is known as ribes and is made up of the various species of currants and gooseberries. Spores from diseased pines cannot carry to other pines and infect them. The spores must first find lodgment on a currant or gooseberry bush and there develop a new spore. This may then be carried to pine trees to infect them. If, therefore, the ribes tribe can be eradicated or greatly reduced, the danger to the pine areas will be removed, or at least greatly reduced.

Understanding this situation, Mr. Cheyney began at Rush Lake, Minnesota, a series of eradication investigations. In the course of these investigations in 1919, he uncovered the important fact that instead of pulling up the ribes plants, the best method seemed to be to grub them out. The reason was, that in the work of eradication it was found that neither from pulled nor grubbed plants did there spring any root sprouts except where the root ends were exposed to the light. The inference from this was that the cutting off of the roots would seem to be more effective than pulling, for ordinary care would prevent leaving pieces of crown in grubbing, while only extraordinary care could prevent the leaving of exposed root ends after pulling. It is believed that the discovery of this fact will simplify, to some extent at least, the problem of eradication.

If, then, a high degree of efficiency in eradication can be maintained, the resprouting can be eliminated by improved methods, "the reduced leaf surface of the ribes crew of plants should certainly give a large measure of protection to white pine, if not complete exemption, from the disease."

OREGON AGRICULTURAL COLLEGE

PROFESSOR W. J. CHAMBERLIN, of the Department of Entomology, Oregon Agricultural College, has for two months been studying extent of insect infestations in yellow pine and means for their control. His field of operations is southern Oregon.

Special areas have been examined and sample plots cruised in several instances and breeding experiments for parasites which will prey on destructive beetles are under way. Professor Chamberlin has also collected some valuable data regarding natural enemies of the dendroctonus beetles.

Experiments looking to possibility of destroying beetles by use of electricity are being started and a demonstration on a scale sufficiently extensive to indicate the merits of this means of attack will shortly be undertaken. Up to the present time the only successful means for destroying the immature beetles has been peeling and burning the bark of infested trees. This is a slow and costly process.

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